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THE

AMERICAN ANTHROPOLOGIST

PUBLISHED UNDER THE AUSPICES OF THE

ANTHROPOLOGICAL SOCIETY OF WASHINGTON



VOLUME VII

JUDD & DETWEILER
PRINTERS TO THE SCIENTIFIC SOCIETIES OF WASHINGTON
1894

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THE
AMERICAN ANTHROPOLOGIST.

VOL. VII. WASHINGTON, D. C., JANUARY, 1894. No. 1.

THE REMAINS OF DON FRANCISCO PIZARRO.

BY W J MCGEE.

INTRODUCTION.

Francisco Pizarro, discoverer of Peru and founder of its capital, the ancient "City of the Kings," is a conspicuous figure in the history of the American hemisphere. Son of a soldier, a stripling in sunny Seville when Columbus returned from the most momentous voyage the world has ever known and when Spain held the balance of power among nations, his life was molded by the inspiration of conquest. Endowed with remarkable physical vigor and mental activity and fired by the burning ambition of the Iberia of his day, he rose among his fellows and early became a leader of men. His indomitable will brooked no defeat; fortified by the fierce spirit of the times, he rose above all obstacles by individual prowess, and many episodes in his career were inscribed in blood. Measured by the standard of his age, he was a conquering hero, worthy the admiration of mankind.

Born about 1471, Pizarro already held place in the New World in 1510, when he participated in the expedition of Ojeda and was placed in charge of the ill-fated settlement of San Sebastian; he afterward accompanied Balboa to Darien, and thus contributed to the discovery of the Pacific. In 1522 his dream of conquest in the half-fabulous earlier El Dorado among the Andes took shape; but it was not until 1527 that he saw the shores of Peru, and five years more passed before he, with his companion Almagro, actually entered the land of the Incas. Although he came with the power and prestige of Spain as "Governor and Captain-General of New Castile," terrible hardships were endured

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before the actual invasion commenced, his experience with thirteen followers on the island of Gallo without ship or stores being an epic of tragedy; and terrible dangers and privations were experienced later, as when, on the headwaters of the Amazon, starving Spaniards were carried on the shoulders of their tireless leader. The conquest of Peru was bloody, and some of the leading acts in the shifting scenes are seen through the mist of years as base treachery and horrible atrocity; for to this degree have times changed and manners softened since Pizarro brought a new culture and the Christian cult to replace the culture and cult of Manco Capac and Mama Huaco.

The career of Pizarro as the foremost Spaniard in South America was not long. In 1535 he founded Lima; Almagro extended conquest into Chile; but dissension soon arose, and when Almagro the Lad succeeded his father, sedition followed. Pizarro was now old; yet when beset by assassins and deserted by his men, he rushed half-armed and alone to the battle, with defiance on his lips, and went down with his face to the foe only when overpowered by numbers. The pent up bitterness against a harsh commander then burst forth and spent itself in indignities upon the lifeless body.

A few hours after the assassination the remains were taken up and given temporary burial in consecrated ground. Then follows a hiatus in the written historical record; but the ecclesiastical authorities soon assumed charge of the body, and so the traditional history is complete for centuries, and the casket, identified by successive generations of church officers, has been carefully guarded as one of the most precious possessions in the Cathedral of Lima.

The three hundred and fiftieth anniversary of Pizarro's death was recently signalized in Lima; and under joint action by the municipal and ecclesiastical authorities, a critical examination of the mummified body was undertaken with the double view of identification and anthropometric characterization. The examination was intrusted to a commission, by whom a full report was prepared and published in a municipal bulletin.* This report embraces a historical account of the assassination of Pizarro,†

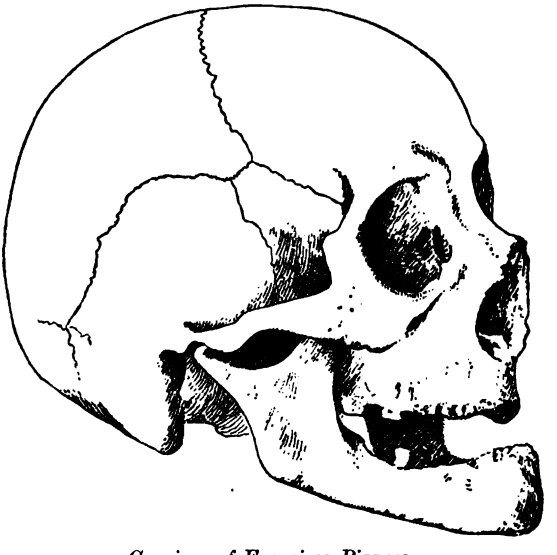
* Boletin Municipal, Lima, Peru, July 25, 1891, pp. viii–xvi.

† This part of the document appears also in "Monografias Historico-Americanas," por E. Larrabure y Unanue, Lima: 1893, pp. 341–355.

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introduced for the purpose of completing the identification. It will be noted that the identification resulting from this examination closes the hiatus in the historical record immediately following the death of Pizarro, to the full satisfaction of the commission and probably to the satisfaction of all. Thus, students of anthropometry are afforded a noteworthy opportunity of juxtaposing the biographic record and biologic characters of one of the world's leaders in thought and action.

It is not the purpose to discuss here the relations suggested by the juxtaposition—the report of the commission is simply



Cranium of Francisco Pizarro.

put on record, partly to suggest and stimulate study, partly to give it permanent place in the scientific literature of our language. But it may be well to note in passing the remarkable character of the mummied skull, viewed in the light of modern anthropology, especially that of recent work in criminology in Italy and elsewhere. In prognathism, in the general conformation of the cranium, in the breadth and fullness of the basal and occipital regions of the brain-case, in the fossa of Lombroso, in all other important respects, the head is that of the typical criminal of to-day. This will be no surprise to modern students

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of the conquest of America who, dominated by the refined sensibilities of enlightenment, follow the bloody career of the conqueror with pain and revulsion; it will be disappointing, perhaps incredible, to the hero-worshipers of our southern continent. Yet it is to be remembered that in this age of human progress, minds and manners are changing with unprecedented rapidity, and that the quality of greatness is not what it was even in the middle of our millennium; the hero of history in earlier centuries is of rugged mold, and the heroism of the olden time is the crime of our softened lexicon. So Pizarro may well be judged as the representative of a class necessary and good in its age but not adjusted to the higher humanities of the present day.

Acknowledgments are due to Señor Manuel Antonio Muñiz, M. D., surgeon-general of the Peruvian army, for the document reproduced below and for photographs of mummy and cranium; to Mr. J. L. Ridgway for the accompanying drawing of the cranium from one of the photographs; to Miss Nora Thomas for a studious translation of the report published by the commission; and to Dr. Frank Baker for revision of the manuscript and proof.

"THE BODY OF PIZARRO AND ITS IDENTITY.

"*Record of the Removal of the Remains of the Conqueror of Peru and Founder of Lima, Don Francisco Pizarro.*

"In Lima, at 10 o'clock a. m. of Wednesday, June 24, 1891, assembled in the crypt of the Cathedral beneath the high altar: the Alcalde of the Provincial Council of Lima, Señor Don Juan Revoredo; the Municipal Commission, composed of Señors Dr. Manuel Aurelio Fuentes and Don Froylan Miranda; the Corresponding Members of the Royal Spanish Academy of History, Señors Don Eugenio Larrabure y Unánue, Don José Antonio de Lavalle, and Don Ricardo Palma; the Illustrious Dean of the Chapter, Monseñor Dr. Don Manuel Tovar; the Special Commission of Dignitaries of the said Chapter, composed of Señors Dr. Don Julio Zárate, Precentor, Dr. Don Faustino Mendez, Curator, and Dr. Don Cárlos García Irigoyen, Secretary; various other gentlemen, canons of the Chapter, members of the Council of Lima, and notable persons; also the undersigned, commis-

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sioned by order of the Alcaldia to make an anthropological examination of the remains of the Marquis Don Francisco Pizarro, Conqueror of Peru and founder of the city of Lima, to wit: Doctors of Medicine, Don José Anselmo de los Rios, leading Professor of the Faculty of Medicine of Lima and Director of the Municipal Chemical Laboratory; and Don Manuel Antonio Muñiz, Assistant Professor of the same Faculty, Physician of the Hospital for the Insane, and Chief Surgeon of the army.

"The Dean pointed out the place where the remains of the founder of Lima were deposited. On opening the iron-barred wooden doors closing a longitudinal niche in the left wall, there appeared a casket of ordinary wood, painted black. The cloth which covered it was then raised, disclosing a mummified body which, by the unanimous declaration of the members there present, represented the remains of Don Francisco Pizarro, preserved here since the founding of the Cathedral, and whose authenticity and identity were established by unquestioned tradition extending over many years and by the constant care exercised during all this time by the Ecclesiastical Chapter.

"The coffin was removed to the Chapel of the Kings [Capilla de los Reyes] in the Cathedral and there opened, revealing a body almost completely mummified, partly covered by vestiges of clothing, which were limited to the upper and back parts of the body.

"The blessing of the tomb and case in which the body was to be finally placed having been completed, the undersigned proceeded with their anthropological examination and record, with the aid of instruments of precision and in conformity with scientific rules.

"The body was lying supine in the casket, rigid, completely desiccated and mummified, of a light brown color similar to that of Peruvian mummies. At first glance the following facts were observed, viz., the absence of the hands, of the skin and soft parts of certain regions, of the genital organs, of the soft parts of the perineum and superior and internal regions of the thighs, etc., as will be specified in detail under each region.

"The body was stripped, save that there was preserved a wrapping of common cloth on the inferior part of the left knee. The fragments of clothing being carefully removed, the body was placed on a table prepared for the purpose.

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"The pieces of clothing, on being examined in detail, were found to consist of: (1) the relics of a short cassock of black silk, of which there remained all of the back part, the left sleeve in fragments, and a part of the left front with a hemispherical button of black silk; fastened to the girdle were short skirts of the same material, completely separated one from the other and 12 or 15 centimeters [4¾ to 5¾ inches] in length; (2) a fragment of fine white stuff which, from the traces of embroidery and needlework, is supposed to have formed part of an inner garment like a shirt; (3) some other pieces of material of different kinds, one small one being of very fine black twilled wool, others being more or less coarse, whose use could not be determined."

"*A—External Examination of the Cadaver.*

"The head, trunk and lower extremities formed one solid mass, remarkable in the rigidity and immobility of articulations of the hip, knee and ankle, as well as those of the vertebræ with one another and with the cranium.

"The skin, adherent, hard and resistant, was intact over a great part of the trunk. Its color varied, being lighter at the back, that of the fore part being very similar to the skin of the mummies of Peruvian Indians. It was destroyed in some places by insects, remains of these appearing. Not the least trace or indication of the pilary system was found on any part of the body.

"The muscular layer had completely lost its volume, and appeared of a very dark chocolate color, its fibers resistant longitudinally, being closely united to the skin. The adipose tissue had disappeared. The structure of vessels and tendons could be clearly traced. The osseous tissue had not lost its physical and chemical properties; many of the bones retained vestiges of their periosteum.

"The head was firmly and solidly attached to the trunk not only by the occipito-vertebral articulations, of which the ligaments remained, but also by the insertion of the muscles of the region of the nape into the rugosities and curved lines of the occipital. It was necessary to separate the head, preserving its relations and the soft tissues so that the divided portions might afterward be reunited.

"The head was found almost completely covered by integument; the trifling deficiency in the frontal and occipital regions

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being referable to mortification of the tissues during life, giving rise to rapid putrefaction. The face was almost entirely devoid of flesh. Why did not the skin and fleshy parts of the face and cranium become mummified like the greater part of the body? The reason is clear, and applies also to some other portions of the body—it is evident that the skin and flesh of the head suffered some influences (wounds, contusions, loss of blood) which hastened the decay in these places before the general effects of mummification were felt.

"The left orbit was entirely empty, the termination of the ophthalmic artery being visible at the bottom. The right orbit contained near the bottom a small sac with a circular orifice in the center of its anterior face, attached to the bottom of the cavity by a small dried muscular tendon; on careful examination this proved to be the iris and sclerotic intact, supported in place by the internal rectus muscle.

"The pericranium being removed, the cranial vault was found to be smooth and homogeneous, presenting no fractures or breaks of continuity. The sutures of the cranial bones were in the main effaced by synostosis, it being noticeable that the synostosis was more advanced toward the posterior region. There were no vestiges of the occipito-temporal sutures nor of the lambdoidal suture, which usually disappear at from 40 to 45 years of age. The obelion and the entire sagittal suture (46 to 50 years) were also obliterated. The squamous suture, somewhat effaced in its posterior part, was distinct in the remainder. The obliteration of this suture begins to be marked at 70 years of age and is definitely completed at 80. The sutures of the pterion (after 40 years) had completely disappeared. The coronal suture (50 years) was yet perceptible, especially on the left side. There remained no vestiges of the metopic suture.

"Nothing of particular interest appeared in the external conformation of the skull except the remarkable development of the superciliary arches and of the glabella. The parietal eminences were well marked. Nothing notable was observed in the lateral faces of the skull. At the base attention was particularly attracted by the perfectly distinct medio-occipital fossa of Lombroso, which was deep and clearly marked.

"The sutures of the bones of the face showed nothing remark-

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able. There was little else of particular note anatomically except the depth of the palatine arch and the perfect preservation of the vomer and the turbinate bones. The diminution of the volume of the inferior maxillary was noticeable. The mental protuberance was considerably advanced beyond the plane of the face, producing marked prognathism. The alveolar border of the bone had been absorbed, diminishing somewhat the height of its body.

"Taking into account the situation of the superior alveolar arch, the cranium may be considered as prognathous [progeno].

"At present there exist no fragments of teeth; but at the time of death there existed in the inferior maxillary the second left incisor, the two canines, and the first and fourth molars of the left side; in the superior maxillary, the left canine, the fourth left molar, and the second and fourth molars of the right side. The appearance, color, and state of preservation of the respective sockets indicate that these teeth became detached at different periods.

"All the anterior and lateral tissues of the neck had entirely disappeared. There remained only the vertebral skeleton with its ligaments and some muscular fragments on its anterior face, where a complete separation was readily observed between the bodies of the sixth and seventh cervical vertebræ; the color and appearance prove the antiquity of this separation, which might well date back to, or shortly after, the period of death. The left aspect of the vertebral column offered nothing remarkable, and the transverse processes, the articulations, and the lateral foramina were entirely covered by the remains of muscles or muscular and ligamentous insertions in such a way that the bony surfaces were not visible. This was not the case on the right side; the transverse processes, the articulations, and foramina of the third, fourth, fifth, and sixth vertebræ were wholly visible, exposed, smooth, lacking the periosteum, with an exterior aspect and coloration, which were tangible proof that the destruction of the soft parts covering and inserted upon these bony surfaces, took place more rapidly than the destruction of the soft parts of the left side. Undoubtedly upon this right side a double phenomenon occurred, which alone can explain the more rapid putrefaction of this side than the other; there must have ex-

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isted here some liquid substance susceptible of decomposition, together with solution of continuity of the skin and soft parts which permitted its effusion. Only the coexistence of these two conditions can explain the more rapid cadaveric putrefaction of this region before the general process of mummification took effect, as in the rest of the body and on the left side. There must have been during life a traumatism on the right side of the neck at the height of the vertebræ before mentioned, which caused a division of the skin and soft parts and produced an extensive loss of blood. Under the anatomical conditions of this region, this wound must have been mortal, because it necessarily divided some of the larger arteries of the region. All of the posterior portion of the neck is perfectly preserved, the skin as well as the muscles of the nape that are inserted in the surfaces and rugose lines of the occipital.

"The trunk was covered by the skin, with the exception of all of the upper and left part of the anterior surface of the thorax, on which the soft parts also were lacking, the periosteum being here uncovered, as well as a small portion of the fourth rib at its articulation with the sternum, and a considerable portion of the first three ribs. At this point there was rapid decay and no mummification. The skin of the back was very well preserved, forming peculiar folds on the upper and lateral regions, and especially on the inferior (gluteal) region, proving the amplitude of the integument, which had become folded before death because of the development of adipose tissue. With the exception of certain small orifices made by insects, there was not throughout the back part of the trunk any break of continuity. The abdominal wall also showed some orifices made by insects, but there were no traces of wounds. The navel was distinct; and the adherence of the skin and muscular layers was so complete that the direction of the fibers of the different deep muscles could be seen. The skin was darker over the anterior portion. The genital organs were entirely wanting; not the least trace of them existed. The genital and perineal regions, the regions of the superior and internal surfaces of both thighs contiguous to the perineum had entirely disappeared, leaving only shapeless remains of dried muscles. Here, then (as in the left side of the neck), something exceptional must have occurred immediately

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after death, as shown by the failure of mummification of this region and by the absence of traces of cutting or destruction posterior to the mummification.

"The left arm was slightly separated from the thoracic cage, leaving the axillary cavity somewhat exposed. The shoulder joint was separated, but this occurred much later than the period of death. The deltoid and other muscular fibers were visible. The superficial fascia of the back part of the arm was present. The elbow was semi-flexed and the forearm was pronated. The joint of the elbow was completely covered, but though the interosseous ligaments were in good preservation, the skin and muscular layers of the forearm were wanting; here also there seems to have been rapid decay. The ulna and radius were in good condition. The carpus was entirely gone, also the metacarpus and phalanges, while distinct and quite recent traces appear of artificial cutting or tearing of the ligaments and other tissues constituting the articulation of the carpus.

"The right arm was in a better condition. The articulation of the shoulder was covered with the skin, which was continuous with that of the trunk on this side. The arm, which was intact, had the skin normally preserved. The elbow was not covered; the head of the radius was observed to be disarticulated, and among the remains of the muscles there was a peculiar coloration, differing from the proper color of muscle, which appeared to have been produced by decomposed and altered blood previous to the effects of putrefaction, this disarticulation and the discontinuity of the skin being apparently contemporaneous with the period of death. The carpus, metacarpus and fingers had also been violently severed or torn, leaving indisputable traces in the coloration of the articular surface and in the sections of the ligaments that some of these mutilations were quite recent.

"The hip, knee, ankle and tarso-metatarsal joints were extended, completely rigid and immovable, and covered by the skin. The integument and the muscular layer were wanting in the superior and internal parts of both hips, and normally preserved in the remaining parts. In the inferior and posterior part of the left hip there appeared a lesion and diffusion of decomposed blood. Both legs were denuded, especially the left. The size of the knee joints, which were entirely covered by the

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skin, was considerable in both limbs, being abnormal and pathological. The tendon of Achilles was well marked and intact in both limbs. Both feet were in extreme extension, and an exaggerated height of the insteps (tarso-metatarsal articulations) was noticeable. Both were covered by skin, intact and well preserved, but the left foot lacked the last metatarsal bone and all the toes except the first phalanges of the fourth and fifth, which remained; and on the right foot all the toes were wanting except the fifth. The phalanges and entire toes appeared to have been removed by violence, the time at which this occurred being relatively recent."

"*B—Examination of the Interior of the Body.*

"The internal organs, as in every mummified body, were transformed into a dark-brown powder, dry, with a peculiar odor, and in the cavities of the trunk this was found to be abundantly mixed with pellets of lime, which were very numerous; these cannot be ascribed to the loosening of the substance from the walls of the niche in which the corpse was deposited, since they were not laminar; they must, therefore, be attributed to the presence of this matter in direct contact with the body during the primary inhumation. This seems the more probable, since it has been proved that certain hygroscopic soils, rich in arsenic and lime, and containing a peculiar fungus recently discovered, are the substances most suitable for mummification.

"The cerebral matter had been converted into a pulverulent, coffee-colored substance containing bits of spongy matter (remains of the pia mater). The meninges were intact, in their natural relations and insertions, though it was necessary to sever them in order to facilitate the measurement of the cranial capacity. The spinal column was found to be in good condition.

"In the thoracic cavity the pleura was observed to be quite distinct, especially in the mediastinum, though there remained no vestiges of the heart or large blood-vessels. The diaphragm was complete, also the urinary bladder, the only organ remaining in the abdominal cavity. The skin and subjacent tissues were wanting in various portions of the left iliac and inguinal regions."

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"*C—Anthropometric Examination of the Cadaver.*

"I. SKELETON.

Length of skeleton, before and after preparation	1.637 m.

"II. CRANIUM.

a.—Capacity and Weight.

Capacity, measured by the water method (approximate)	1715 cub. cent.
Class, megacephalic.	
Weight (after emptying cavity and removing skin, ligaments and exterior parts)	955 gram.

b.—Linear Measurements (rectilinear).

Diameter, maximum longitudinal	189 mm.
" " transverse	157
Cephalic index (transverse longitudinal)	83.1[1]
Class, hyper-brachycephalic.	
Diameter, maximum transverse frontal	130 mm.
" minimum " "	104[1]
" transverse occipital	121
" antero-posterior, through inion	187
" antero-posterior, metopic	182
" basio-bregmatic (maximum height)	147
" bi-auricular	111
" interparietal	154
" bi-mastoidal	129
" bi-temporal	141
" bi-stephanic	125
" bi-asteric	125
" bi-zygomatic	136
" of orbit, maximum transverse	41
" of orbit, minimum " (height of orbit)	40
Orbital index	97.5[2]
Class, megaseme.	
Interorbital distance	21 mm.
Depth of orbit	42
Nasio-subnasal line	60
Length of nasal bones	26
Width of nares	25
Nasal index	73.5
Class, platyrhine.	

[1 Printed figures corrected by Dr. Manuel A. Muñiz.]
[2 Computed by W J M.; given in print as 100.]

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Maximum diameter of foramen magnum	32 mm.
Minimum " " "	28
Index of foramen magnum	87.5[1]
Length of palatal arch	50 mm.
Width of " "	44
Nasio-basilar distance	107
Nasio-frontal "	61
Nasio-bregmatic "	135
Nasio-vertical "	155
Nasio-lambdoidal "	189
Distance from nasion to extremity of maximum fronto-occipital diameter	187
" [from nasion] to external occipital protuberance	182
" from alveolar point to basion	92
" from basion to border of forehead	134
" from basion to nasion	101
Basio-lambdoidal distance	118
Distance from basion to external occipital protuberance	88
Bi-orbital distance, external	118
" " internal	27[2]
Bi-malar distance	112
Bi-jugal distance	114
Total altitude of face	161
Distance from a plane tangent at bregma to root of nose	82
" from inferior edge of nasal bones to anterior nasal spine	34
" from anterior nasal spine to superior alveolar border	23

c. Circumferences and Curves.

Maximum horizontal circumference	548
Longitudinal circumference (nasion, bregma and basio-alveolar)	580
Sub-cerebral curve	45
Sagittal curve	16
Transverse interparietal circumference	510
Bi-auricular circumference	364
Super-occipital curve	68
Total occipital "	123
Super-auricular "	170
Pre-auricular "	140
Occipito-frontal "	390
Total frontal "	150
Total transversal "	510

[1 Computed by W J M.; given in print as 81.8.]
[2 Stricken out of printed measurements by Dr. Muñiz.]

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d. Angles.

Facial angle (after Cuvier)	71°

"III. Inferior Maxillary.

Weight of mandible	47 gram.
a. Lines: bi-condyloid length	128 mm.
mental length	43
bi-gonian length	98
Height of symphysis	30
" " molar	19
Length of ascending ramus	60
Width " " "	30
Gonio-symphyseal distance	90
Distance from condyloid to coronoid process	39
b. Curve: bi-gonian	191
c. Mandibular angle	130°

"IV. Trunk.

Maximum circumference	820 mm.
Minimum "	780
Length of sternum	211
Distance from seventh cervical vertebra to coccyx	605
Bi-humeral distance	364
Bi-acromial "	334
Distance from navel to pubic symphysis	159
Bi-trochanterian distance	313
Distance between superior-anterior iliac spines	272

"V. Limbs.

Left humerus	315
Left radius	252
Left ulna	267
Right humerus	315
Right radius	248
Right ulna [sic; 263 ?]	283
Femur (both sides)	415
Distance from middle popliteal plane to eminence of inferior surface of calcaneum	450
Length of remaining portion of right foot	232
" " " " " left "	231
Greater circumference of left foot	220
" " " right "	240

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"*D—Deductions.*

"From this examination it may be deduced:

"1. That the body examined was inhumed in a soil artificially charged with lime;

"2. That the stature, measured directly on the body, is 1 meter 673 millimeters. Applying the different tables of existing statures (Orfila), it is found that a humerus of 31 cm. corresponds to a height of 1.67 m.; a radius of 24 centimeters, to a height of 167 m., etc.; so that the height of 1.673 m. in this body is corroborated by the tables of reconstruction. This stature, according to the classification of Topinard, is comprehended in the group "above the medium;"

"3. That the age of the decedent was more than 70 years;

"4. That the body belongs to the masculine sex, as shown by the significant characters of the cranium, pelvis, femur, etc., which without exception correspond to this sex, as well as by its exterior aspect and the absence of mammæ;

"5. That the individual appears to have belonged to a superior (white) race;

"6. That, notwithstanding the complete mummification, there are distinct signs of decomposition, due probably to putrefaction of some parts of the body (right side of neck, upper and left part of thorax, left forearm, etc.) which very possibly correspond to wounds (one mortal) received during life;

"7. That the examination of this body demonstrates the existence of certain individual abnormalities—inferior prognathism, depth of the palatal arch, existence of the middle occipital fossa of Lombroso, extraordinary diameter of the instep, etc."

"The anthropometric examination completed, the body was entirely cleaned by several successive applications of a saturated alcoholic solution of bichloride of mercury, and after the last was absorbed, a coat of carbolized glycerine was applied.

"The head was re-attached to the trunk; the skin of the lower and posterior part of the neck, which had been divided in the examination of the cranium, was stitched; the remaining tissues were also united at all points where they had been severed by cadaveric putrefaction; the occipito-cervical articulation, as

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also the humero-scapular articulation of the left side, were respectively strengthened by means of copper wires against the contiguous ribs and the clavicle; the thoracic and abdominal cavities were filled with carbolized cotton, as was the pelvic cavity, the artificial opening made in the perineal region; the through cranial cavity having been previously filled with the same substance after impregnating the adhering flesh at the base of the cranium first with oxychloride of zinc and then with anhydrous sulphate of lime to dry it. The skull separately, as well as the entire body, was photographed in different positions before being placed in the coffin.

"All of the surfaces (skin, bones, etc.) were varnished with a superfine varnish, and the cotton wherever exposed was impregnated with essential oil of sandal [aceite esencial de sándalo citrino].

"The body was then arranged in a wooden coffin, lined with black cloth, with a glass lid, the lower extremities being bound to the casket by means of black cords. The lid was closed, tied in two places with cords like the foregoing, sealed on the lid with red sealing wax and two seals: the Great Seal of the Chemical Laboratory and a small special seal. In this condition the coffin was delivered to the Municipal Commission composed of Señors Dr. Don Manuel A. Fuentes and Don Froylan Miranda, who in turn placed it in the charge of the Venerable Metropolitan Chapter [Cabildo Metropolitano].

"The remains of clothing were enveloped first in a strong yellow-satin paper, then in a coarser dark wrapping paper, then packed in a cylindrical roll, bound with copper wire, sealed on the ends and the flap in red wax with the Great Seal of the Municipal Laboratory, and labeled. The pulverulent remains taken from the cavities of the body, the fragments of skin from the head, and the minute bits of muscle and membrane were deposited in an ordinary glass bottle with wide mouth, closed with cork. This was sealed with the same seal as the former, the mouth being further secured by a white hempen cord fastened to the neck, and the bottom was wrapped in a piece of white ruled paper folded over several times and attached to the neck of the flask with red wax, sealed with the center of the same seal of the laboratory, and also labeled. Both objects were delivered in this condition to the Commission.

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"The present record was then drawn up in triplicate, in conformity with the last orders of the Alcaldia, on white paper belonging to the Municipal Chemical Laboratory of Lima, and signed by ourselves and the gentleman mentioned at the beginning, Señor A. B. Pretell, assistant of the laboratory, acting as secretary.

"Before proceeding to sign, the three members of the Royal Academy of History presented the following information, written by their dean, Señor Larrabure y Unánue, and affirmed by the gentlemen of the Academy, which, through the historical agreement with the foregoing anthropologic and anthropometric examination, sufficiently proves in their judgment the authenticity of the mortal remains of the Conquistador."

"'*I.*

"'The exhumation and study of the body of Francisco Pizarro, just 350 years from the time of the assassination of that immortal captain, are events of the greatest importance, for which we have just consecrated to them some lines while the ancient City of the Kings is feeling justly moved with such a motive, and at a time when the world, evoking the records of the discovery of America, is preparing to celebrate the fourth centennial of the wonderful achievement of Christopher Columbus, which opened to the Spaniards the gates of countries vast as they are rich.

"'In order to proceed methodically with this work, done with the rapidity which the time required, we must offer to the reader a true version of the assassination of the marquis, obtained from the best sources of information; next, proceed to determine the principal wounds which he received; then examine the body in order to determine whether the mortal remains presented to us are authentic, and whether the technical information given by the physicians agrees with the revelations of history.

"'*II. The Assassination.*

"'It was the 26th of June, 1541. At nine o'clock in the morning the conspirators assembled in the house of Don Diego de Almagro. The clerk, Henao, had forewarned Pizarro of the peril he incurred, it having been told the former by one of the conspirators, Francisco de Herencia, who thought possibly that he had saved his soul from the pains of hell, having prepared for

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the crime which he plotted by the taking of holy sacrament; but Pizarro, without attaching much importance to the warning, declared, "This clerk desires a bishopric," and taking no great precaution, merely refrained from going out to mass, hearing it in the palace instead.

"'No care was taken to fasten the heavy door of the building, and while the lieutenant-governor, Doctor Juan de Velasquez, was assuring the Marquis that while he held "The rod of justice in his hand nobody would venture," the insurgents [los almagristas] invaded the court armed with coats of mail, breastplates and halberds, two cross-bows and an arquebus, uttering cries of "Live the king!" "Death to tyrants!"

"'In the court there were five persons, and in the hall more than twenty; but almost all fled like cowards, including the Doctor, who, putting the rod of justice in his mouth, perhaps in order to keep his word about carrying it in his hand, jumped out of a window which opened into the yard. Others hid themselves under the beds or inside the wardrobes.

"'Martinez de Alcantara and two attendants ran to defend the door of the hall; at the same time Francisco Pizarro, casting off the scarlet dressing gown which he wore, hastened to the inner apartment, and with a most resolute spirit, donned a breastplate, clumsily fastening it himself, and, unsheathing his broadsword that had served him since the beginning of the conquest, said: "Come you here, my good sword, companion of my labors!"

"'His brave defenders being dead or wounded, the group of infuriated assassins entered freely, encountering the Conquistador at the door of the dressing-room; there ensued a struggle as unequal as it was desperate; Pizarro received the thrusts on his cloak, which was wrapped around his left arm, at the same instant dealing mortal blows at his enemies. Frenzied at the delay, Juan de Rada, the chief of the assassins, seizing his companion Narvaez, cast him against the Marquis; the latter received him on his sword, thrusting his body through with it; but while he was striving quickly to dispatch his victim, he received a terrible wound in the neck and fell in a pool of blood.

"'In an interesting document of the time at which these events occurred, we learn further that Pizarro received a wound in the breast made by a pasador, a sort of arrow very sharply pointed,

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which has disappeared with the cross-bow;* and other chroniclers assure us that as the body still breathed, although lying on the ground, the soldier Barragan gave it a severe blow in the head with a water jug which stood near.'

"'*III. Profanation of the Body.*

"'The body remained on the ground while matters of state urgently called the chief conspirators to the city. There can be no doubt that some persons proposed immediately that the corpse should be dragged to the plaza, the head cut off and publicly exhibited on a gibbet; but this could not be accomplished in the excitement and alarm that arose throughout the city.

"'In fact, Don Garci Diaz, Bishop elect of Quito, earnestly opposed placing the body on the gallows. Captain Gomez de Alvarado went to the plaza with a lance in hand and manifested his indignation at the crime which had just been committed, censuring Juan de Rada for his conduct. The monks of the convent of La Merced produced the Holy Sacrament to prevent new crimes and robbery; but Captain Don Francisco Chavez went to intercept them and told them contemptuously: "Return, Fathers, to the church, for you have nothing to come out for."†

"'In the excitement of these moments there is little doubt in regard to the profanation of the corpse in the chamber where it lay abandoned. Pizarro was very severe in military discipline; and while the leaders were preparing a farce of government, the mortal remains of the Conquistador, with no guard to defend them, lay exposed to the vengeance of inferiors.

"'As our readers will see farther on, criminal amputation was performed on the body, and authentic documents exist confirming the truth of these observations.

"'In short, the manifestations of rage against the remains of Pizarro did not cease until the shades of night began to cast a veil over the scene, until a woman, the wife of Don Juan de Barragan, in company with him, the secretary, Lopez, and some Indians, mercifully wrapped the body in a white cloth and placed it in the vault beneath the church. Strange circumstance! There was not enough earth to entirely cover the tomb

* "'Letter of Vaca de Castro to the Emperor Don Carlos (Nov. 15, 1541).
† "'Cieza, Guerra de Chupas, cap. xxxii.

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of a captain who had discovered such vast countries and had given such riches to the crown of Castile!*

"'The foregoing statements are sufficient for our purpose.'

"'*IV. The Wounds.*

"'Entering now into an enumeration of the wounds and blows, we find: As the struggle culminating on the threshold of the dressing-room was comparatively open, since it is evident that Juan de Rada, on thrusting Narvaez upon Pizarro, exclaimed, "How slow this is!" it is undoubtedly true that the Marquis received the first wounds in the left arm, which, wrapped in his cloak, was serving him as a shield. Moreover, these are seen on the body which has just been exhumed.

"'The principal wound was in the throat, according to the testimony of those who participated in the tragedy and all the early writers, and according to the technical report of Doctors Rios and Muñiz, there appears one, deep and destructive in the body, dissipating all doubt on that point. The tendons of this side of the neck have disappeared through putrefaction, showing the passage of the knife between two of the dorsal vertebræ; while the skin covers the face almost intact, uniting the head with the trunk.

"'There do not exist any perfectly distinct marks of the blow given with the water jar, but it is supposed that this merely damaged the tissues without injuring the bone. The death of the Conquistador cannot be attributed to this blow, and it is accepted as an evident fact that the mortal wound was that in the neck. The thrust undoubtedly penetrated to the cerebral mass, which has entirely disappeared during the last 350 years.'

"'*V. The Head, Hands, Genital Organs.*

"'It is worthy of notice that, in spite of the great lapse of time, the body, straight, dry, and rigid, displays wonderful preservation.

"'The head, adhering firmly to the body, although the contrary has erroneously been stated, reveals in its notable cerebral capacity a superior man.

"'It is true the hands are lacking, but this loss does not date back to a remote period; according to public rumor they were taken off and carried out of the country not many years ago.

"'*"And there was not even enough earth to finish covering his grave.'" (Obiedo, Historia General y Natural.)"

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"'Equally noticeable is the lack of the genital organs; but this defect, which scientific men have rightly assured us is as old as the date of death, we will explain in concluding.

"'In a letter from the corporation of the city of Cuzco to the Emperor Don Carlos,* relating these events, we see that the conspirators committed outrages on various persons "Who were found in the hall; that after the death of the Marquis, in order to dishonor and ridicule him, they committed upon his person *many inhuman and infamous things*, which, that your Majesty who mourns him may receive no further pain, we refrain from describing."

"'What acts of ignominy, we ask, could have been perpetrated on the body of Pizarro of such a nature that the gentlemen of the corporation dared not report them in detail to his Imperial Majesty? And there arises another question, What was it that the soldiery did in similar cases when they were infuriated against the Indians or indeed against those of their own race?

"'Therefore, whether or not the body of Pizarro was taken to the plaza before being buried, or, what is more probable, remained in the chamber at the palace, it is a fact that it was profaned, and that to this act of profanation should be logically attributed the absence of the organs of his sex.

"'And hence the silence that has been preserved on this point by the chroniclers of the time should not be considered strange, interested as we may suppose the majority of them to have been in concealing their great crimes, especially against their own companions in arms who had given them glory and fortune.'

"'*VI. The Back.*

"'It is no less important to observe in a body whose adhering skin and whose bones present marks of the wounds which Francisco Pizarro received, that the back appears uninjured.

"'This discovery indeed reminds us of the attitude of the combatants in 1641 [sic; 1541]. The Marquis, assailed by the numbers of malevolents, closed the way into his chamber against them, attacking boldly and in front, like a lion; his back and posterior parts are therefore preserved unharmed, and his body bent only beneath the blow of a knife directed treacherously from one side.

"'* Cuzco, January 20, 1543.'

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"'These facts, in which historic data and the remains of the Conquistador of Peru are in harmony, yield a new proof of his uprightness and valor, and are further eloquent proofs of the identity of the remains.'

"'*VII. Prognathism of the Chin.*

"'Another satisfactory feature of the body is the prognathism of the chin.

"'We have compared the dead countenance with the best portraits which exist in Lima; and if we may be permitted to frankly express our opinion, so far as it is possible to reinvest a skull with the flesh and skin of life, the identity is complete.

"'The strongly projecting chin indicates a persevering man, tenacious in his ideas; we see the lieutenant of Nuñez de Balboa who distinguished himself by cruelties to the poor Indians; who seized near Acla his own benefactor, the immortal discoverer of the Pacific, obeying the orders of the unforgetting and malicious Pedrarias; the captain of the "famous thirteen," who so heroically maintained himself in the midst of the disasters on the island of Gallo; and the conqueror of Atahualpa, who did not give up his designs even before the immense advantages of a victory as great as it was unexpected.

"'This prognathism reveals much; and it is sufficient to identify the principal actor in the bloody tragedy enacted in the plaza of Cajamarca on the 16th of November, 1532.'

"'*VIII. Size, Feet, Age.*

"'The size of the body is the same as that given by the historians. The stature of Pizarro has been somewhat exaggerated, because Almagro and the majority of those who were about him were small; but it may be affirmed that his figure was correctly proportioned, and that he was rather a well-formed and robust man, when we remember that more than once he carried his comrades during the fatiguing expeditions of discovery.

"'His foot, endowed with a very high instep, like all of his conquering race, recalls the warrior indefatigable on the march, whether on the desert tracts of the coast or in the wilds of the Peruvian Cordillera.

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"'As to his age, although at first there was great disagreement among the chroniclers, some giving it as 66 years, others 76; and although a relative of his (Pizarro y Orellana) states that he died at the age of 81, we have concluded, after carefully investigating the matter, that Don Francisco Pizarro was undoubtedly born at the beginning of 1471, and that consequently he was a little more than 70 years of age at the time of his death. We have discussed this matter in a separate work.'*

"'*IX. Authenticity.*

"'From the foregoing hasty examination results the complete authentication of the body from the point of view of historical proof. The doubts which have existed on this point—and it is unknown how and by whom they were initiated—are baseless and we can rest assured that, more fortunate in this than other cities, we possess the remains of the discoverer of our country and founder of the first Christian population.

"'Indeed, how would we account for the taking away by any one of the mortal remains, of which act it may be said in passing there is not the slightest tradition, and the replacing of them by another corpse and making thereon the identical wounds found on the original one? This is inconceivable. And with what object and how could such a fraud have been practiced, since the lens, analysis, and, above all, the trained and intelligent eye of the man of science could easily detect it, thanks to the progress which has been made in this respect in anthropologic knowledge? Have we not to-day powerful means for determining the age of a body, the period at which given wounds were received, the marks which indicate wounds and the effects of putrefaction, the physical conditions, and, further still, the virtues and infirmities which characterized this very man in life?

"'And in the case of Pizarro the conditions of the body agree so well with the facts of his history; the scars found on the body correspond so exactly with true records; more than all, the body has existed traditionally for such a long period here in our sight in the crypt of our Cathedral, undisturbed in its sheltered sepulcher by the turbulent civil wars with which our

"'* The principal historian of the conquest, Prescott, gives conflicting statements concerning the age of Pizarro in two passages of his work.

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country has been torn, and whose echoes have died away in this subterranean vault, that we consider it absurd to retain the slightest doubt on this point.'

"'*X. Conclusion.*

"'Lima may, therefore, feel proud at the possession of so rich a treasure, and may pay the honors due to the Marquis Don Francisco. However great the defects of the discoverer of Peru, none can deny his exemplary perseverance, his heroic valor, and his true fatherly love for the city which grew from his planting.

"'This body personifies a whole epic. It recalls a series of events which would seem to belong rather to the domain of fable than to that of history; his terrible struggles with the Indians and with the obstacles of nature in crossing the isthmus of Panama to open a passage to the South sea, enabling the Spaniards finally to transport their brigantines on their shoulders from one ocean to another; the heroic resolution taken by the "famous thirteen" on the island of Gallo; the discoveries and explorations from Tumbes to Cajamarca; the march of Hernando and a number of soldiers to the coveted Temple of Pachacámac; the bloody scene of Atahualpa, in which the empire was seized and overthrown; and, as the closing scene, the internecine wars which caused to fall beneath the sword the two brothers, as they were called in the times of their intimacy: Pizarro, crafty and domineering; Almagro, confiding and generous, victims both of their own audacity and lack of education.

"'For the countries which stretch from Pasto to Tucuman and Patagonia, this body symbolizes, furthermore, the gradual and certain change, in which we are yet assisting, in the religion, languages, races, institutions, and customs of the powerful empire of the Incas.

"'What various and what interesting memories of our life are to-day invoked by the body of Francisco Pizarro; the discovery, the conquest, the viceroyship!'

"In Lima, at 10 o'clock a. m., on Wednesday, July 22, 1892, the gentlemen who have signed the above report and who formed the commission which had been previously appointed

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to receive and exhume the remains of the conqueror of Peru and founder of Lima, Don Francisco Pizarro, and to prove his identity and state of preservation, assembled in the Cathedral for the purpose of removing the body from the temporary casket in which it had been deposited on the twenty-fourth of the preceding month, and placing it in the case destined to guard it for the future, arranged in the Chapel of the Kings of the Cathedral, under the care of the Venerable Metropolitan Chapter. On proceeding to the said chapel they found the temporary casket intact and just as it had been left on the 24th, with the same seals and bindings. The Municipal Commission likewise delivered up the bottle in which the cadaveric remains of the viscera had been temporarily placed, which, on being examined by Doctors Rios and Muñiz, was found in the same condition as when given to the said commission.

"They then made the final removal in the following order:

"1. The body of the Conqueror was taken from the casket and arranged in a case of white marble, with glass on three sides, reclining on a couch covered with cherry-covered cloth.

"2. The glass bottle containing the pulverulent remains of the body was also deposited in a small crystal case with base and lid of white marble, this being in turn placed within the large case at the foot of the body.

"3. One of the three copies of the present document (which is composed of thirty-six leaves [carillas útiles], containing an account of the ceremony of June 24, of the present year, and that of this date, both signed by the gentlemen mentioned at the beginning of the former) was also deposited within the large case, inclosed in a tube of tin washed with gold and sealed like the case (with a blank seal, oval in form, and containing the words "Honorable Municipality of Lima" on the circumference and the word "Alcaldia" in the center) on red wax; the second copy is to be placed in the archives of the Ecclesiastical Chapter, and the third in the archives of the Council. Thus terminates the record. [Signed:]

"*Juan Revoredo, Manuel Aurelio Fuentes, Froylan Miranda, Eugenio Larrabure y Unánue, José Antonio de Lavalle, Ricardo Palma, Manuel Tovar, Julio Zárate, Faustino Mendez, Carlos Garcia Irigoyen, José A. de los Rios, Manuel A. Muñiz.*"

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SONGS OF THE MODOC INDIANS.

BY ALBERT S. GATSCHET.

During numerous conferences which the author has had in former years with Modoc Indians he was enabled to record from dictation a number of curious songs which they highly prize and frequently sing while either at work or sitting idly in their lodges. Only a few of them are of a lugubrious character; the majority are merry utterances of a mind free from care. There are erotic songs, dance-songs, satiric and mythologic songs, all being delivered in a way that is half spoken and half sung. Some, however, have attractive and elaborate melodies, which, if well arranged for the piano or string instruments, would doubtless produce a sensation in cultured communities.

I. Of the songs below, the first one is introduced as being sung or spoken by a small species of prairie-owl (*Speotyto hypogea*), which has the faculty of turning its head around and then turning it instantaneously to its normal position. The bird is therefore called in Modoc *rollhead* or *turnhead*, and, like everything else seemingly miraculous or unaccountable, is made the subject of songs and folk-stories. When this owl draws its body up it appears almost ball-shaped, and when it travels over the surface of the prairie seems like a light-colored ball rolling rapidly over the ground. This owl lives in the ground. It is referred to in two conjurers' songs published in my "Klamath Indians of Southwestern Oregon," I, p. 154 (Washington, 1890) as Nû'sh pilan tilalua'nsha, which signifies "as a head only I roll around," and (*ibid.*, I, p. 167) as Lu'paksh ge'-u mu'luash, "white chalk is my medicine tool," because the feathers of the bird are of a chalk-white or grayish shade.

In the song below, the man, after throwing off his garments and limbs, appears also as "a head only" and rolls on for many miles, when he is seen partaking of food inside of his subterranean lodge. Evidently the "hi'shuaksh," or young man, who had just carried his sister on his back to her bridegroom and left her close to a pine tree, had become exhausted by his exertions,

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and to feel more free had thrown away all his clothing, then parted also with some of his limbs and was transformed into a "rollhead." The faithfulness of the dog is well sketched, and the whole song is somewhat dramatic, which is not generally characteristic of Indian songs. The songs of the Pacific slope Indians are usually much shorter than the following, not often exceeding two lines in length.

NUSH-TILANSSNÄ-ASHAM SHUI'SH, THE SONG OF THE ROLL-HEAD OWL.

Hi'shuaksh tu'pakshash e'nank ge'pgapĕli shuino'ta:
A man (his) sister carrying on his back returned while singing

"Tchu'i hai tak nā nen kōsh tam'no'la."
"Just now we (have gone) to the pine and have returned from it."

Wa'tchag: "Wa-wā'-a-a'!

Hi'shuaksh: Tchi'shka Äliu-iwa'ga, ge'pk'i, mìsh ta'la nû
Dear pet Äliu iwa'ga, come here, I just only wanted

gi'tki giu'g ak; pu'edsha nû kādshigo'ga. Shui'na:
to tell (you); I throw away (my garments) being exhausted. (Then) he sings:

"Tchu'i hai' tak nā nen kōsh tam'no'la."
"We have just gone to the pine and came back from there."

Hi'shuaksh vutō'dshna wa'kshna.
The man throws away (his) moccasins.

Watcha'ga (Dog runs after the moccasins and brings them back): Wa-wā-a-ā-a!

Hi'shuaksh: Tchi'shka Äliu-iwa'ga, ge'pk'i, mìsh ta'la
My little Äliu-iwa'ga, come to me, to you simply

nû gi'tki giu'g ak, pu'edsha nû kādshigo'ga, shui'na:
I wanted to tell (that) I throw away (my limbs) being fatigued, says:

"Tchu'i hai ta'k nā nen kō'sh tamĕno'la."
"Presently we have come back from the pine."

Pu'edsha tcho'kash hi'shuaksh.
(Then) throws away (his) legs the man.

Watcha'ga: (Dog runs after the legs): Wa-wā-a-a'.

When the man had thrown away not only his moccasins but both legs, and the faithful dog had run after them and brought them back to his master, at the same time barking wa-wā-a-a', he also sacrificed his shirt, his hat, and both arms, repeating the words: pu'edsha tchu'lish, tchu'yesh, wäk: "*I cast away my shirt, my head-cover, my arms.*" The dog then tried to carry home the discarded articles; but after repeating the "Tchishka Äliu-

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i-wa'-ga, etc.," the ungrateful man finished by cutting his own neck, so that the head (nu'sh) was the only remaining member. The head traveled on and on for miles and miles over the earth. The end of the story is as follows:

Tu'paksh ga'lampaga, itkalpĕli'n na'nuktua pue'dshish ki,
(His) sister followed him, picking up everything he had cast away

sχa'tkalshtka ska'tchampĕle; tchu'i ga'tpa shtinā'shtat, te'lhin
(and) in (her) basket carried (it) home; after arriving at the lodge, she looked down

shlä-a' nû'sh pila pa'pkash. Ga-ulolteha'mpĕle tu'paksh, tch'hû'nk
(and) saw (his) head only; it was eating. Stepped down (from the lodge top) the sister, and

ska'lχan vusho'kanksh. Nen ka-ta'nian.
putting down (the basket) was thoroughly frightened. What is said, (goes) so far.

II. THE ROBIN REDBREAST—A CRADLE SONG.

Una'sh, una'sh kima'dsh pa'tak ⏑ —′ | ⏑ ⏑′ | ⏑ —′ | ⏑ ⏑′
una'sh, una'sh wala'sh pa'tak ⏑ ⏑′ | ⏑ ⏑′ | ⏑ ⏑′ | ⏑ ⏑′
una'sh, una'sh tshiwi'p, tsiwi'p ⏑′ | ⏑ ⏑′ | ⏑ ⏑′ | ⏑ ⏑′
tchī'tch, tsī'ts, tchī'tch. —′ | —′ | —′

Early in the morning will eat ants (the robin),
early, early will it pick at the cedar-tree,
early in the morn (it chatters:) tchiwi'p, tchiwi'p,
Tchītch, tsīts, tchītch.

This very pretty song is also sung in the following strain:

Una'sh pa'tak kimā'dsh p's'w'p,
una'sh pa'tak kimā'dsh wi'sχak,
una'sh, una'sh p's'w'p, p's'w'p.
tchī'ts, p's'w'p, tsī'ts.

The cradle song graphically depicts the habits of the wi'sχak or robin, which is seen earlier than other birds flying toward the cedar to pick at the bark in search of ants. The mothers tell their babes that Robin Redbreast sings the above p's'w'p song to its young and sometimes also to its grandmother. The grandmother often plays a part in bird-lore: the ō'lash or gray dove when raising its plaintive voice is supposed to utter complaints before its grandmother.

III. SATIRIC SONG.

K'u'-i ak mish nē'pkia Ku'huasht' hû nunatu'ga.
⏑ ⏑ ⏑′ | — —′ | —′ ⏑ ⏑ | —′ ⏑ | —′ ⏑ | ⏑′ ⏑
"Uneasy you feel at Koha'shti for its numerous pyres."

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This is a dance-song composed by the people of Ya'-aga, the main settlement of the E'-ukshikni or Klamath Lake Indians on the lower course of Williamson river. In spite of its serious wording it is in satiric allusion to the inhabitants of Koha'shti or Guhua'shktchi, "boat-starting place," or lake harbor, three miles north. It also applies, by a sort of word-play or calembour, to Kuya'ga, "little bad place," a settlement near Ya'-aga, the allusion occurring in the first two words: k'u'-i ak, *uneasily perhaps.* The song is of an earlier date than the Modoc war of 1872–1873, and refers to the frequent cremations which once took place at Koha'shti, probably after an epidemic. The idea of "numerous" is not expressed by a separate word, but lies in nunatu'ga, the *distributive* verbal causative of nu'ta, *to burn:* nutu'ga, *on account of one cremation;* nunatu'ga, *on account of so many or several cremations.* The incremation of the dead was abolished among the Klamath Lake and Modoc Indians in 1868, four years after the conclusion of their treaty with the Government.

GLOSSARY TO THE TEXTS.

For a more thorough understanding of these poetical specimens, a glossary for the linguistic analysis of each term is added. The emphasized syllables are made distinct by an acute accent, which is here placed after the vowel, as in shle'a and shlä-a', *to see.* Long syllables show the macron (¯), short ones the breve (˘), and these, enlarged, are used also to give an idea, however slight, of the metrics in two of the songs.

ak, hak, *only, but.* When used as a suffix, it forms diminutive nouns, which end in -a'ga, -ak, -ka, etc.

Äliu-iwa'ga, name of a dog. The diminutive ending -a'ga shows it to be of an endearing or caritative import.

e'na, *to carry* ONE *long object, as a person.* Used here for "carrying on the back" a bride to her future husband, a custom prevailing throughout the Pacific Coast tribes, and performed by one of her nearest relatives. To carry MANY long objects is i'dsha.

ga'lampaga, *to march behind,* or *in a file; to follow* somebody going.

ga'tpa, *to come to, arrive at a distance* from the one speaking. Cf. ge'pka.

ga-ulo'ltcha, *to go down, descend upon the outside ladder* or *steps of a winter-lodge.* Ga-uloltcha'mpĕle, *to return by descending* in the same manner.

ge'pgapĕli, *to come back, to return* to the starting place or *home* of the one speaking.

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ge'pka, *to come;* ge'pk' i, *come thou,* imperative form. Used when the coming is a coming toward the one speaking. Cf. ga'tpa.

ge'-u, *my, mine.*

gi, *to tell, to say;* gi'tki gi'ug mîsh, *in order to tell you.*

hai, ai, a particle which is in most instances intranslatable, but refers to acts or things *seen* or *visible:* "as you see."

hi'shuaksh, (1) *husband;* (2) *male person.* Literally "consort, associate."

hû, Modoc particle for hû'k, hûnk in Klamath; points to *distance* in tim and space.

i, *thou, you;* mish, *thee, you,* the objective case of i.

i'tkal, *to find, to pick up* long objects as sticks, boxes, garments, etc.; i'tkalpĕli, *to pick* them *up again, repeatedly.*

ka, *so much;* ka-ta'nian, *so much of it, extending so far in length* or *size.* Modocs use this term to say that a story told has come to an end.

kä'dshika, *to be tired, exhausted, fagged out;* kädshigo'ga, verbal causative: *on account of being tired.*

kimä'dsh, *ant;* lit.: "the one who travels sidewise."

kōsh, kūsh, *pine-tree.*

Ku'huashti, "at the boat-starting place" on the northeastern end of Upper Klamath lake, Lake county, Oregon. See remarks in Text.

k'u'-i, *badly, wretchedly, uneasily, mournfully.*

lu'paksh, *chalk, lime-substance.*

mish, *thee, you, to thee, to you;* the objective case of i, *thou.*

mu'luash, *tool, implement,* and applying to conjurers' practices only. Literally: "what makes ready," from mu'lua, *to be ready.*

nā, abbrev. from nāt, nād, *we.*

na'nuktua, *everything,* and *every sort of thing;* compound of na'nuk, *every, all,* and tua', *which thing?* and *thing* in general.

nen, particle corresponding to our: *as they say, as reported, as you hear.*

nē'pkia, the medial form of nē'pka; *to feel, to have a sensation.* Refers here to sensations of a sickly, disagreeable kind, the adverb k'u'-i, *badly,* being added to the verb.

nû, *I,* nu'tak, *myself;* its objective case is nûsh, nish, *me, to me.*

nû'sh, *head.* nû'sh pi'la, *the head only, as a head only.*

nu'sh-tilansnä'-ash, *rollhead owl;* Speotyto hypogea.

nu'ta, *to burn, cremate.* nunatu'ga, *on account of repeated cremations* (of bodies).

ō'lash, û'lsh (1) *white hair* or *down;* (2) *mourning dove,* whose note is ō-ō; Zenaidura carolinensis. A derivative is ō'lshaltko, *gray-haired* or *having gray down.*

pa'ka, *to eat, to feed on;* pa'pkash, *eating for a while,* or *continually.*

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pi'lan is a compound of pi'la *only* and *n*, abbr. from nû *I, myself.*

p's'w'p, imitation of the robin's note.

pu'edsha, *to throw* or *cast away.* pue'dshish ki, *he was* or *had been throwing away.*

shle'a, *to see, perceive;* shlä-a', *she saw* at the time.

shtinä'sh, *lodge, wigwam, house.* shtināshtat, locative case: *at* (her) *wigwam.*

shui'na, *to sing;* shuino'ta, verbal durative: *while singing.*

shui'sh (1) *song;* (2) *conjurer's song,* and also *conjurer's song-object,* these being mainly animals invoked by the conjurer to find out the disease of the patient.

ska'lχa, *to put down a basket* or similar implement; ska'lχan is participle of the present tense: *putting it down.*

ska'tcha, *to carry* something *in a basket* or similar implement. ska't-champĕle, *to carry back* or *home* in *a basket.*

sχa'tkalsh, *basket.* sχa'tkalshtka, instrumental case: *in* (her) *basket.*

tak (1) particle not easy to translate, but marking contrast or contrary statements; (2) when appended to verbal stems it forms a future tense in Modoc, as in pa'tak, *it will eat,* for pa'n tak; pa'n, *to eat.* Pa-ua'pka is another form for the future tense.

ta'la, adv., *straightly; only, but.* ta'la ak, *just only.*

tam'no'la, *to return from,* kōsh, *from the pine tree.* Derivative of ta'mĕnu *to travel.*

tch'hûnk, *and then;* abbreviated from tchu'i hûnk.

tchi'ska, *pet, darling;* the ending -ka (-aga, -ak, -aka) shows it to be a diminutive form.

tchī'tch, tsī'ts, imitations of the note of the robin redbreast.

tchiwi'p, imitation of the note of the robin redbreast.

tcho'kash, *leg* and *legs.*

tchu'i, *then, afterward, and.*

tchu'yesh, any *head-cover,* as *cap, hat, ornamental head-dress.*

te'lhi, *to look down to the ground; to look into,* as into a lodge or wigwam. Te'lhin, *looking into.*

tilalua'nsha, *to roll about, to turn around, to revolve,* v. intr.

tu'pakship, abbr. tu'paksh, *younger sister.* Modocs use the word more frequently in the generic sense of *sister.*

una'sh, û'nash, and u'na, *at an early hour.*

vusho'kanka, *to be scared* or *frightened* for *a while* or *thoroughly.*

vuto'dshna, *to throw off, to cast away* while going or traveling.

wä'k, wēk, *arm* and *arms.*

wa'kshna, *moccasin,* sing. and plural.

watcha'ga, wa'tchag, *dog.*

wi'sχak, *robin redbreast,* Merula migratoria.

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ON CERTAIN PERSONAGES WHO APPEAR IN A TUSAYAN CEREMONY.*

BY J. WALTER FEWKES.

In a January celebration known as the Po-wa'-mûh, men disguised as monsters, to which the name Na-tac'-ka(s) is given, appear in the Tusayan pueblos. I have not been able to identify these or to determine what animals they represent, although I am quite confident that they are animistic.

Evidence is accumulating that traces of the same cult are to be found in Old Mexico and in the Tusayan villages. Finding other resemblances between personifications in Tusayan and Nahuatl ceremonials, I seek in this article to use the figures of certain Mexican beings in a comparative way to decipher the significance of the Na-tac'-ka(s).

While in charge of the Hemenway exhibit at Madrid, in 1892–'93, I had occasion to study the colored figures of the paraphernalia of the Coyutl(s) in a rare MS. of Padre Sahagun.† The resemblance between the heads of these figures and the helmets worn by the Na-tac'-ka(s) led me to make tracings of them for future use, and a later study of these tracings seemed to throw light on the determination of whom the Na-tac'-ka(s) represent. As these figures have not been published it has seemed well to reproduce them, and it is thought that they may afford evidence of relationships between Nahua and Tusayan mythologies. My drawings (Pl. I, Figs. 1, 2, 3) of the masks of the Na-tac'-ka(s) are accompanied by a short description of the same. The ceremony of the Po-wa'-mûh in which they are used will be described

* The material used in the preparation of this article was obtained while the author was attached to the Hemenway Expedition, in the summers of 1891–'92.

† Historia Mexicana por Fr. Bernando de Sahagun (libros viii, ix, x, xi) en lengua indigena, con figuras é ilustraciones Manuscrito en fol. perg. de 342 fojas numerados. This MS. was exhibited at the Madrid Exposition (1892–'93) by the Biblioteca de la Real Academia de la Historia.

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later.* It is the occasion of the renovation of all the Hopi ki-vas, resembling the Nahuatl Ochpaniztli or ceremonial in honor of *Teteoinnan-Tlaçolteotl* or *Toci*, the goddess of the earth.

In order to give an adequate account of the characteristic rites which occur when the *Na-tac'-ka(s)* are personated in the Hopi villages it would be necessary to describe the *Po-wa'-mûh* † or bean-planting ceremony, which occupies several days and in which the personifications of several deities appear. A complete description is reserved for another article, but it may be useful to mention some of the doings of the *Na-tac'-ka(s)* in this observance as a basis for future comparisons.

Before sunrise of the same day *So-yok'-ma-na* had visited the kivas and conversed with the priests. At about noon on the final day of the *Po-wa'-mûh* men personifying *So-yok'-ma-na*, *Ha-hai'-i-wüq-ti*, and five *Na-tac'-ka(s)*, three black and two white, accompanied by two *He-he'-a Ka-tci'-na(s)*, went from house to house in the village of Walpi demanding food. The monsters begged like gluttons, as described in the "Summer Ceremonials," and the two attendant *Ka-tci'-na(s)* carried bags and pouches as receptacles for these gifts. Whenever poor food was offered them *So-yok'-ma-na* whistled and the *Na-tac'-ka(s)* hooted like owls.

Children who had not yet received a flogging, which is ceremonially performed at a certain age by a personage called

*The masks described and figured in this article are kept in darkened secret chambers in Hano, the Tewan Tusayan pueblo, but I have likewise drawings of the Na-tac'-ka masks of Walpi, made under more favorable circumstances by Mr. Stephen during the celebration of the Po-wa'-mûh. A more detailed description of these and of the dress, accoutrements, and paraphernalia would more appropriately appear in a description of the ceremony mentioned. The Tewans of Hano are more closely akin to Rio Grande villagers than to the Hopi, by whom they are surrounded, so that some care is necessary in building any generalizations upon the character and origin of the ceremonies in which they figure. There is, however, no doubt that the *Na-tac'-ka(s)* are not characteristic of the Tewans, but probably once appeared among all the Pueblos.

† The *Po-wa'-mûh* is a ceremony that occurs in January, in which the renovation or new plastering of all the kivas takes place. It has several points in common with the Ochpaniztli of the Nahuas, the Ocna of the Mayas. Possibly it is in part a lustral ceremony—a New Year's observance almost coincident with the return of the Ka-tci'-na(s).

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Tuñ-wup-ka-tci-na, during the *Po-wa'-mâh*, were not allowed to look upon the *Na-tac'-ka(s)*, and to prevent this their eyes were shaded by the hands of their mothers.

After the houses had been visited the squad made a tour of the kivas, in each of which the ceremony to the six World Quarter deities * was being celebrated. On their arrival at the hatch or entrance of the kiva a comic dialogue ensued, in which *Ha-hai'-i-wüq-ti* demanded food and the elders in the chamber below refused to give him anything. The hoots of the Na-tac'-ka(s) and the whistle of *So-yok'-ma-na* were then heard, and a lariat was lowered into the kiva by the *He-he'-a-ka-tci-na*, to which they found attached upon drawing it up later a sheep-skin and goat-horns.

A description of the masks used in personifications in primitive ceremonials is important, for on them is depicted most of the characteristic symbolism of the deities represented. Masks and accompanying head-dresses are as a rule the distinguishing disguise of the deity, and we can compare those used by different peoples to discover true homologies and to draw conclusions from their similarities. Wrong homologies or fancied likenesses leading to errors naturally occur here as in kindred sciences, nor do intimate resemblances in all instances mean a connection, but true homologies are of greatest value in the discussion of the relationship between ceremonials among people with a similar or identical cult.

By permission of one of the Tewa I was shown into the chamber in which the *Na-tac'-ka* masks are kept, and was secretly permitted to make sketches and a cursory examination of them. The following notes and figures are the results of these studies.

The first set of masks which will be considered are worn by men who personify *Na-tac'-ka(s)*, of which I have examined five—one yellow, two black, and two white. While they resemble each other in general symbolism, there are certain differences in detail and mode of construction which are worthy of mention.†

* The character of this ceremony is outlined in the account *Ni-man'-ka-tci-na*. See Journal of American Ethnology and Archæology, vol. II, no. 1.

† The masks are more accurately described as leather helmets, and their projecting mouths vary from two to three feet in length.

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The black *Na-tac'-ka* helmet (Pl. I, Fig. 1) reminded me of an alligator's head, but neither of the jaws is movable. The leather of which it is composed is painted black with a mixture of shale and water, the jaws being stiffened by a framework composed of strips of dried gourds or wood. Upon the back of the head are tied the stumps of corn-husks and radiating feathers which project fan-shaped when the mask was in use. On each side of the head is a curved horn* made of a gourd or an ox-horn, extending upward and backward. At its base of attachment is a strip of skin covered with fur and painted yellow. The tip of each horn is painted black and the main portion colored green and girt by a single black band. A small feather is tied near the free end of each horn.

All the five helmets of *Na-tac'-ka* bear horns of similar shape tied in the same position, and in the figurines of the same these appendages are always present. The two eyes of the helmet are each about the size of a large marble, and are made of buckskin, attached to the helmet on top of the head just above the horns. In all the *Na-tac'-ka* helmets these eyeballs are painted black, and have a white zone painted upon them which represents the iris. They are free from the head except at their basal attachment, to which is bound a small tuft of feathers. Midway between the point of junction of the eyes and the helmet there is an arrow-shaped figure painted green which is common to all the helmets. The long, projecting upper and lower jaws are separated by a broad slit forming the mouth, which thus appears partly open. Girting the rim of this slit above and below there is a bright-red band representing the lips. Outside of this band there is a second broader band, painted white, which is common to all the helmets. Downy feathers of the eagle are fastened to this by means of a sticky substance, forming a scanty covering.

On both edges of this band short, stiff, black horse hairs, arranged in rows, are affixed in such a way as to contrast with the white downy zone enclosing them, standing at right angles to the helmet. The teeth of the mask are conical, arranged in single rows in both upper and lower jaws, and project slightly below the lips. These teeth are made of dried corn husks bent into shape by folding. In the interior of the mouth, filling the

*This is not represented on the *Coyatl* helmets.

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cavity between the right and left lower jaw, is a huge tongue made of leather, painted red. This tongue is not protrusible.

The yellow and white helmets (Pl. I, Figs. 2, 4) are in general form like the black, but somewhat differently made. The white helmet especially differs from the black in the construction of the jaws. The whole helmet is painted white, the eyes and horns being, however, of the same color as the black, and the lips are adorned in the same way. The upper jaw is formed of half of a large gourd, and is fastened to the covering of the head with convex side uppermost. By an ingenious apparatus this gourd is so joined to the leather which forms the head of the helmet as to admit of free movement upon it, and by means of a string is made to open and close. This mask (Fig. 2) is painted with white kaolin and is one of the most striking of the five.

The jaws of the yellow mask, which are also made of split gourds, are more rounded than those of the white and less pointed than the black. It is also smaller than the others.*

In the same chamber with the masks of *Na-tac'-ka* I found also the helmet mask of *Ha'-hai'-i-wüq-ti*.† This personage has some resemblance to *Teteoinnan-Tlaçolteotl* (*Toci*), the goddess of the earth of the Aztecs, and some to *Huehæcoyotl*, the "Old Coyote" of the same. Possibly she may be the same as *Coyotlinahuatl*, the "Coyote Spirit," which, according to Sahagun, was adored by the Amantecans. Her helmet is a simple one of hemispherical shape, painted black. The front portion, however, is white, and the position of the eyes are indicated by two crescent-shaped black marks. On each cheek there is a round red dot. The crescent marks under the eyes are constant features in representations of this personage.

There was also another mask or helmet hanging on the wall which is very different from those which we have described.

*The white, yellow, black, etc., colors may correspond to the cardinal points. We may thus have the *Na-tac'-ka* of the east, etc. I would suggest that the same idea, although possibly not the same correspondence, existed in the Mexican Indians' conception of the different-colored *Cognil(s)*. This suggestion by no means implies that I am right in my interpretation that the *Na-tac'-ka(s)* are the same as the *Cognil(s)*. The principle is a far-reaching one throughout the whole mythological system.

† *Na-tac'-ka yü-a-mïr.* The *So-yok'-ma-na* or *Na-tac'-ka* maid is also personified in the Po-wa'-mûh.

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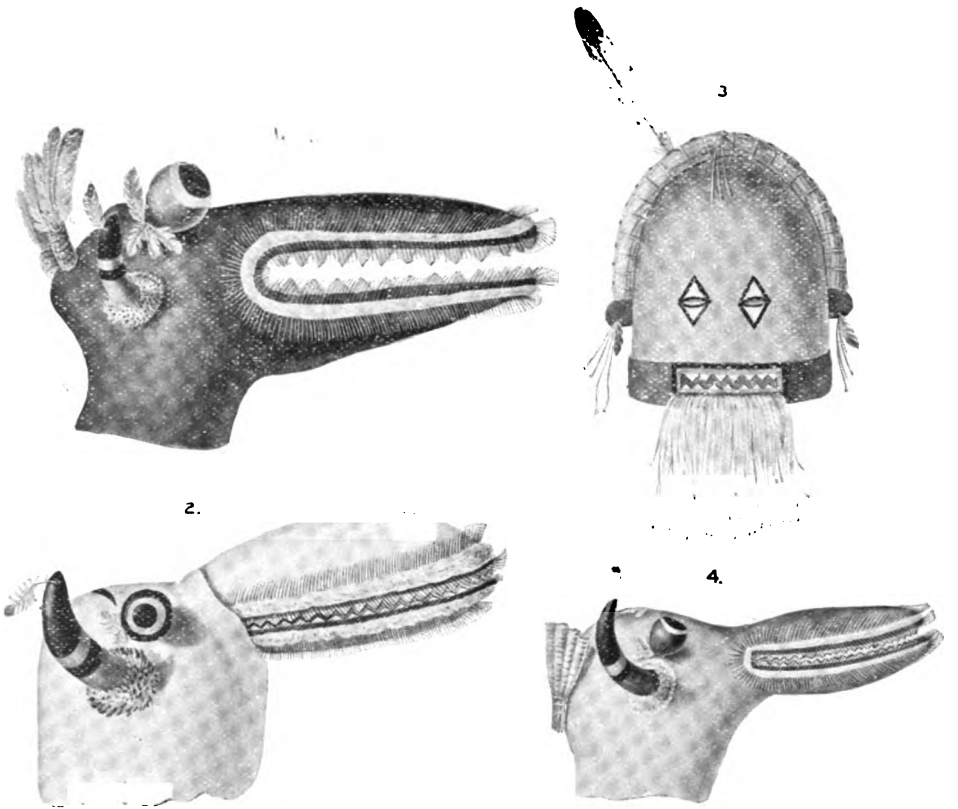


PLATE I.—Masks of Na-tac'-ka(s).

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This helmet (Pl. I, Fig. 3) is worn by a personage, *So-yok'-mā-na* (*Na-tac'-ka-ma-na*), who accompanies the monsters. This helmet is marked by characteristic symbolism. Around the lower rim it has a black band made of leather, in which a broad open region indicates the mouth. The teeth are zigzag notches cut in the leather, and the lips are indicated by a red rectangular band surrounding the teeth. The helmet has a long black beard made of stiff horse-hair. The main portion of the helmet is colored green, without symbolic markings. The eyes are lozenge-shaped figures with black outlines enclosing white interiors in which longitudinal slits indicate the eye openings. Over the top of the helmet is arched a bundle of corn leaves extending from ear to ear. At intervals in this archway are inserted feathers taken from the tail of the eagle, arranged in the shape of a fan. The ears are semicircular blocks of wood, and from them a few pine needles and feathers hang as ear-rings. A pine needle is also appended to the crest of the head.

One of the most important means to study the characters of Hopi mythology is the symbolism of the same which appears in pictographs, on pottery, in figurines, or graven images. The symbolism of the figurines is possibly the most important, since it is the custom of these Indians to introduce in their celebrations ancient wooden and stone images of certain personages who figure in their mythology. These figurines invariably bear the symbolism which characterizes the mythological personages and are invaluable aids to a study of the meaning of such divinities. In addition to these figurines introduced in ceremonies, there are others which have a less sacred character, but are almost identical. These latter, called *ti'-hu(s)* (dolls), present valuable data in a consideration of the subject with which we are dealing.

These wooden images are given to little girls at a ceremony which precedes the Snake dance or the Flute celebration in the month of August.* They are treated by the girls as playthings, being carried about on their backs as the mothers carry their children, and to all intents and purposes are simple objects to play with. These dolls invariably bear the symbolism of different mythological personages called *ka-tci'-nas*, which figure in

*They are also traded among the Hopi at the winter festivals.

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the sacred dances. They are in no respect idols, and, as far as I could observe, were not worshipped by children or adults. If, therefore, my theory is a correct one, the dolls among civilized nations are simple survivals of figurines used as idols, and we have among these people a transition stage in which the doll still preserves the symbolic marks characteristic of the idol. Whatever the signification of the figurines may be, they undoubtedly serve as most valuable objects for a study of the symbolism of different personages which figure in the dances, for they are fashioned with more or less skill in imitation of the same, and symbolic markings are rigidly adhered to.

Using these figurines as a means of studying the character and meaning of the masks which we have already described, let us consider first a doll of *Na-tac'-ka*. During my studies at Walpi I purchased a very good doll of this personage, very cleverly carved, with the head bearing all the features described in the masks. The doll is a large one, the body having a slightly stooping posture, and is exceptional in that the arms and head admit of independent movement from the body. The head is painted black and the mouth is prolonged into an elongated snout, armed with rows of teeth indicated by dentations. The lips are painted red and the teeth brown. On either side of the head there arises a horn, black on its tip and girt with green bands. The eyes are raised wooden black balls, each with a white iris. In the middle of the forehead there is painted the green arrow-head, pointing forward. A fan-shaped crest of feathers projects from the back of the head. The body is clad in a miniature buckskin blanket, under which is a kilt of the same material. The lower part of the body is painted white, with vertical red stripes. The right lower leg is yellow and the left green, but the feet are painted red. It will be seen in comparing the description of the mask with that which we have given of the doll of *Na-tac'-ka* that both have all the features of symbolism in common.

Using now a doll of *Ha-hai'-i-wüq-ti* in the same comparative way in which we have considered the doll of *Na-tac'-ka*, we find a similar parallelism between the mask worn by this person and the graven image of the same.

I have studied several dolls referred to this person, *Ha-hai'-i-wüq-ti*, and all agree in symbolism with that of the mask. One of the best specimens in my collection is about three inches

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through the body and seven inches in height. The top and back of the head are painted black, and the face is white. On either side of the face there is an ear-like lappet colored red and a cluster of feathers is tied to the crown of the head. The face is crossed by vertical red lines, representing the hair which is found on the mask of certain dancers. In the middle of each cheek there is a round, red spot, and the eyes and mouth are indicated by a crescent painted black and curving upward, inclosing a round, black spot. In front of the ears on either side of the face a coil of black wool is fastened in imitation of the hair as worn by married women of the villages. The blanket is carved in wood, painted white, with a blue border and alternating broad and narrow parallel red lines on each side. Beneath this carved blanket there is a black undergarment, and the representation of a belt painted yellow and red. The legs are white and the lower part of the foot is black.

In another doll of the same name the general symbolism is identical, but there are several differences in the ornamentation of the blanket. The arms are not represented in any of the dolls of this personage which I have seen, but a number of parallel red lines arranged side by side sometimes make the border of the white blanket. In this case similar parallel lines are also depicted upon the back. The face is always white, but sometimes outlined in red. The crescents forming the eyes and mouth and the red spots on the cheeks are generally present.

Let us now turn to the figures of the Coyutl disguises as drawn by Sahagun.

This writer's figures (Pl. II) represent different-colored skins with attached heads and a human figure (Pl. II, Fig. 1) clothed in a similar covering. He indicates the name of each by a legend at its side. We know that it was customary in Mexican ceremonials for participants in religious festivals in which animistic gods were represented to disguise themselves in the skins of animals, but very few of these have been preserved. I found what may be an example of this paraphernalia in the Spanish exhibit in the Exposición Historico-Americana, preserved in the Museo Arqueologico* of Madrid. In Plate III a figure of this

*I am indebted to the Museo Arqueologico for permission to figure this skin, and to Dr. Nordenskiöld for the photograph of which a drawing is here reproduced.

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interesting object is reproduced. Waiving the question as to whether this specimen is ancient or modern,* we can say that in either case it is valuable as showing the disguise of one of these animistic personifications.

There are appended to Sahagun's figures of the Coyutl(s) the following names, to which are added the different colors:

tlapalcoyutl, red, pink.
tlecoyutl, black with red flame-shaped bodies.
tlilticoyutl, brown.
ciltalcoyutl, brown with white spots.
chamolcoyutl, almost black, very dark brown.
xiuhcoyutl, blue with black marks.
iztaccoyutl, white.

In a comparison of these with *Na-tac'-ka* masks the reader is invited to note the following resemblances:

The etymology of the names used by Sahagun to designate them is formed by a union of the Nahuatl word for color as a prefix in many cases, *iztaccoyutl*, white-coyutl, etc. The different *Na-tac'-ka* are designated in the same way. (See nomenclature of *Na-tac'-ka*.) The head of the "*Coyutl(s)*" bears, back of the ears, in Sahagun's figures, an appendage comparable with that borne by *Na-tac'-ka*. The *Coyutl* best figured by Sahagun carries a shield in the left and a war club (?) in the right hand. The *Na-tac'-ka(s)* carry bows and arrows and other weapons.

The structure of the mouth and the form of the snout are similar in the figures of the *Coyutl(s)* which are found in Sahagun, and the same parts in *Na-tac'-ka(s)* in the masks, dolls, or elsewhere. It seems not impossible that the deities or mythological personages represented in both instances are the same. If not derived from each other, it looks as if their resemblances were more than coincidences.

The paraphernalia of the *Na-tac'-ka* differs from that of the Coyutl(s) in this respect. The latter, as shown by Sahagun's figures, have a pelt of the animal for a covering for the body as well as a helmet. These are absent in the *Na-tac'-ka(s)*, but it is a remarkable coincidence that the men who personify them

* If modern it is a survival of ancient practices. Some of the figures upon it are ancient in their character.

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PLATE II.—The Coyutl(s) and Papalotl(s).—After Sahagun.

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sometimes fasten, by means of a sticky substance, feathers or cotton to the trunk, legs, and arms. The appendages to the dance costume figured by Sahagun are interesting in this connection.

I interpret the close similarity of the Coyutl(s) of Sahagun and the Na-tac'-ka masks as one of many resemblances between Nahuatl and Hopi ceremonialogy, indicating either that both are derived from a common cult or from each other.*

In this connection Sahagun's figure of a man with a papalotl tablet (Pl. II, Fig. 9) has already been mentioned in the article quoted above. These, like the Coyutl paraphernalia, are likewise of different colors—izpapalotl, çaqua-papalotl, tli-papalotl, and xola-papalotl. The custom of wearing symbolic tablets on the back still survives in Tusayan, but I have never seen a tablet with the butterfly depicted upon it. The Sun tablet of the Hopi † is remotely similar to Sahagun's çaqua-tonatiuh.

The resemblance of this *papalotl*,‡ butterfly, tablet in its symbolism to that of the *ho-ko'-na* or butterfly of the Tusayan people is close, and the resemblance to the symbolic butterfly found on pottery§ from old Cibola and Tusayan ruins is even greater. The different-colored *papalotl(s)* figured by Sahagun are believed to refer, as also do the *Coyutl(s)*, to the cardinal points.

I would suggest that the different colors used in Sahagun's figures refer to the different world-quarters, of which the Nahuas and the Maya, like the Hopi, probably recognized six. I have made no critical examination of the arguments on the different colors corresponding to the cardinal points, but will refer to

* For other evidence see American Anthropologist, July, 1893.

† See various Tusayan ceremonials, as Mam-zrau'-ti, Na-ac'-nai-ya, etc.

‡ It is quite comprehensible that a symbolic figure of the same animal may have originated independently, and we should expect likenesses in such independently drawn figures, but there are anatomical characteristics seen in the Nahuatl and Hopi symbolic butterfly which do not exist in the genera in the two countries. But the main point in my comparison of the Nahuatl and Hopi ceremonial butterfly is not in the symbolism, but in the fact that a ceremonial or mythological conception of this animal exists in both people. Other nations have the same, and the deification of the butterfly is not peculiar to either Nahuas or Hopi.

§ I have a small food-vessel from Tusayan, upon the outside of which is depicted the butterfly and the snake. The butterfly is sometimes represented on the back of masks and ceremonial helmets.

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Schellhas's identifications* based on the Codex Vaticanus and Landa's *Xma kaba kin* ceremony.

Aztec—South, blue; west, green; north, yellow; east, red.

Maya—South, yellow; west, black; north, white; east, red.

The eight Coyutl(s) figured by Sahagun correspond with the Nahua in two instances, blue and red (?) only. There is, however, a more exact comparison of the colors given by Sahagun with those of the Mayas given by Schellhas.† With the present confusion in relation to colors applied to cardinal points by writers on the Nahuas, it is impossible to definitely refer the different-colored Coyutl(s) of Sahagun to their respective cardinal points. Possibly these people were not as strict in their ceremonial use of colors, as applied to the cardinal points, as the Hopi are, although that fact is no argument against the principle of the use of colors applied to different figures as indicative of direction. A similar uncertainty attaches itself to the use of certain gods and special animals to denote cardinal points‡ among the Mayas, but Rosny finds in the Codex Tr. that the fish is emblematic of the north, the dog (?) of the east, and a species of armadillo of the west.

As we obtain more and more exact notions of the ceremoniology of the Pueblos and related Indians, we bring to light a body of facts which can be used in a comparative way in connection with that described and figured by Sahagun and other Spanish writers on Mexico. We find peoples in New Mexico and Arizona still practicing rites which can at least be compared with those of the Nahuas. Evidences drawn from symbolism alone must be treated with caution, since isolated likenesses go for little; but when these multiply, as they do on all sides, we can use them, or rather we are justified in using them, in tracking the spread of a cult from land to land.

In the preceding pages I have not said that the *Coyutl(s)* are

*See Seler (*Zeit. f. Ethnologie*, 1891, Heft iii, pp. 108, 109) for a different assignment of colors to cardinal points by the Mayas.

† Die Maya-Handschrift der Königlichen Bibliothek zu Dresden, p. 33.

‡ The war-priests at Walpi have the following animals depicted on the four walls of their chamber: North, mountain lion; west, bear; south, wolf; east, wild cat; but these only preside for warriors. This important question must be considered at length elsewhere.

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the same as the *Na-tac'-ka(s)*, but have simply compared the symbolism of the two. From the limited knowledge derived from drawings in a MS. it would be too hasty a judgment to superficially compare them and jump at the conclusion that they are identical. Taken in connection with other resemblances between Nahuatl and Hopi culture, it looks as if the likenesses in symbolism may have a deeper meaning than simple coincidences.

Undoubtedly there is a vein of similarity running through the ritual and symbolism of all tribes of the American race; indeed, we might likewise say, between those of all primitive people in Europe, Asia, Africa, or America. I am thoroughly in sympathy with that school of folk-lorists who believe that similar environment, exerting its influence on man in similar stages of culture, produces similar intellectual results; but a reactionary influence may lead upholders of this school too far. It is one thing to form a theory of relationship on individual resemblances in symbolism and quite another to build on a firm foundation of many homologies. Caution would counsel to avoid all comparisons; but the highest science is comparative, and facts are only stepping-stones to deductions. Notwithstanding similarities in mythologies, which, like physical features, belong to all members of the American race, nomadic or sedentary, I believe, like linguistic peculiarities, that they fall into a number of categories, and that the culture of the Pueblos is more closely related to that of the Nahuas than to some others.

Wide variations in the ceremonial observances of aboriginal peoples of related culture are to be expected, and I have already elsewhere shown how the Ni-man'-ka-tci-na, for example, varies in three of the Hopi towns. Local variations naturally arise, due to special environment, and I do not feel that it is necessary to find an exact parallelism in all the Nahua and Hopi ceremonials to show that there is a similarity in the cult of those who practice them.*

It will be necessary to reserve an account of the character of the *Na-tac'-ka* until I describe the *Po-wa'-mâh* ceremonial, which occurred in January, 1893. As far as can be learned, the *Na-tac'-ka(s)* were monsters killed by the God of War, *Pü-ü-koñ-hoya*,

*Journal of Amer. Eth. and Arch., vol. ii, No. 1.

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with the lightning.* They appear in the Pueblos to maintain discipline among children, and no one has yet mentioned to me the coyote as in any way connected with them.

There are several significant differences in symbolism between the *Coyutl(s)* and *Na-tac'-ka(s)*. In none of the former are there any representations of horns on the side of the head. The existence of these horns is a strong objection to considering the *Na-tac'-ka(s)* as Coyotes and almost fatal to a theory that the *Coyutl(s)* and *Na-tac'-ka(s)* represent the same animals. The other differences are less significant and can readily be explained. If the resemblances of these two sets of personages were the only facts to be quoted in support of a likeness in Nahuatl and Hopi ceremonial systems, we might hesitate to give them more than a passing notice, but when we find that the evidence is cumulative, that they are only one of many, we are justified in giving more careful attention to the resemblances between them.

I have elsewhere† presented evidence, mostly drawn from symbolism, that the cult of the plumed serpent still exists in the Hopi villages, and that there is a resemblance between Quetzalcoatl,‡ Kukulkan, and *Ba'-lü-lü-koñ*. The same cult is likewise found at the present day at Zuñi, where we have the exact equivalent of *Ba'-lü-lü-koñ* in the mythological being called *Ko'-lo-wissi*. That the same likewise once existed or even still survives in the beliefs of other pueblos is very probable.

There is a similarity between certain other mythological personages of the Hopi Pantheon and those of Central America,

*According to one priest, the *Na-tac'-ka(s)*, like the gods of war, are the offspring of the Sun and *Ko'-kyan-wüq-ti*, the Spider woman. They are also called children of *Ha-hai'-i-wüq-ti*. They are said to be monsters and are associated with *Kwa'-to-ko*, the giant eagle; *Wa-ko-tcai'-zri-zrü*, the great elk, and *Tca'-ve-yo*. The pictograph of the "giant eagle" is given in my article on "Tusayan Pictographs," *Amer. Anthrop.*, Jan., 1892.

† In the same article (*Anthropologist*, July, 1893) attention was called to the identity of ornamentation on a Nahuatl brazier for holding burning copal, and ladles from Cibola and Tusayan ruins. The rasping stick used by the *Ka-tci'-na-ma-na(s)* in their accompaniment to the songs of the dancers is very similar to a femur with notches from Mexico. One of the latter was exhibited in the Madrid Exposition. (See Walter Hough's article, "The Columbian Historical Exposition in Madrid," Am. Anthropologist, July, 1893, p. 273.)

‡As a name of the plume-headed snake, not as a mythical hero-god.

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but it is simpler to confine the attention to the explanation of the existence of the Plumed Serpent cult in the Hopi villages. If the existence of this in the pueblos can be demonstrated and its connection with Mexico proven we have taken one step forward in connecting the two systems.

The facts elsewhere presented conclusively prove that the cult exists in Arizona at the present day.

How did this cult come to Tusayan? Was it by barter* or exchange passing from tribe to tribe, or was it brought by migratory clans, refugees to the arid deserts of northeastern Arizona? Among the several peoples that by amalgamation make up the present Hopi stock, are there any who came from peoples of Mexico who were once in contact with or a part of the Nahuatl culture?

It is difficult to satisfactorily answer these questions for several reasons. Mythological conceptions and religious ceremonials may have been facilitated, in their distribution, by prisoners taken in war. One tribe may purchase a ceremony from another, and it may thus be transmitted from one people to another. A simpler answer is more probable. The cult may have been brought by clans in their migrations. Among the different peoples which constitute the Hopi stock,† the water people, insist that their ancestors came from the far away "Red Land of the South." This is, then, possibly the one from which these striking resemblances may come. The water people, whose descendants still exist and have a high social standing in Walpi, declare that their ancestors came from *Pa-la'-kwa-bi*, the Red Land (*pa'-la*, red; *kwa*, land; *o'-bi*, place of) of the South. This semi-mythical place is far away and in derivations reminds one of Huêhuetlapallan, or the Old Red Land of the Toltecs, to the

* It is related by the Hopi that a delegation of Zuñis once came to Walpi to purchase the Snake-Antelope rites. They brought many presents to barter for it, but the Hopi priests refused to sell it. Mr. Cushing informs me by letter that the Zuñis have a Snake Society, but the Hopi say that this is not the same as their Snake-Antelope Assemblies, although it is of course possible that it may have been the same in times long past.

†I believe it can be demonstrated that the Hopi stock is composite and that the arid plains and lofty mesas of Tusayan have been the asylum of peoples of several stocks. The last addition from the Rio Grande has in fact not yet been amalgamated, although their kindred, the Asa people, long ago lost their identity.

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north of the City of Mexico. These water people may then have brought up some element of the *Ba'-lü-lu-koñ* cult from northern Mexico.

The legendary history of the Water People, as given by Mindeleff* from Stephen's notes, is very tantalizing and full of inconsistencies, but there are a few statements about their migrations which are highly suggestive. The cause of their departure from *Pa-la-kwa'-bi* was due to an old man, but *Ba'-lü-lü-koñ* was their friend. He flooded the land, and at one time clothed the Water People in turkey skins that they might escape. It is stated that the Pima and Maricopa Indians are descendants from some women of their people whom they left in their migration toward the north. The cranes assisted the warriors by carrying them on their backs. The glimpses of Mexican legends which crop out in these stories are interesting. Quetzalcoatl is by some held to be a mythic hero-god of the Toltecs, to whom Tezcatlipoca appeared in the guise of an "old man,"† and by whom he was sent on his wanderings to find Tlapallan.

The Aztec war god, Uitzilopochtli, immediately after birth engaged in combat with his brothers, the Centzon-Uitznaua, sons of Coatlicue, and slew them. There is a legend among the Hopi that *Pü'-ü-koñ-ho-ya*, their war god, slew the giants, and that the *Na-tac'-ka(s)* are survivors. The similarity of these myths would seem to associate the god Uitzilopochtli and one of the twin war gods of the Hopi, *Pü'-ü-koñ-ho-ya;* and the *Na-tac'-ka(s)* with the Uitznauas. Seler says (Uitzilopochtli dieu de la guerre des Aztèques, Separate, Paris, 1892, p. 12): "Les Centzon-Uitznaua qui se disposent à attenter aux jours de la déesse, doivent donc être des génies ennemis de la vie de la nature. Cela s'indique dans leur nom Uitznauatl, qui veut dire chose pointue, piquante, tranchante, comme une épine." If the *Na-tac'-ka(s)* are the same as the Uitznauas new light may be thrown on their nature by this interpretation.

*A Study of Pueblo Architecture, Eighth Ann. Rep. Bur. Ethnology.

† For stories of Titlacahua (Tezcatlipoca) and Quetzalcoatl, see Bancroft's Native Races, vol. iii; also Müller's Amerikanische Urreligionen. Tezcatlipoca was a war god or hero-god of the Nahuas. His cult was preëminently that of the Aztecs, although that of Quetzalcoatl coexisted with it, the temple of the latter being built near by the greater one of the terrible god of war.

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PLATE III.—Disguise used in Mexican ceremonials.

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There are several similarities between *Pü'-ü-koñ-ho-ya* and his brother (twin) and the Mexican Uitzilopochli and Tezcatlipoca. The symbolism of the Mexican war gods is somewhat different (see Seler, *op. cit.*, p. 8), but "les dieux Tezcatlipoca et Uitzilopochtli se conformant l'un a l'autre très directement." Another name of the former was Telpochtli, which, says Seler, signifies "young." Père Duran designates the ceremony Teotleco, which signifies "the god has come," as the fête of the birth of Uitzilopochtli, which recalls the youth of this personage. The termination *ho'-ya* in *Pü'-ü-koñ-ho-ya* is translated "little" or "young;" (*chi'-ho-ya*, "little boy;" *man'-ho-ya*, "little girl"). The two Aztec gods of war* may correspond with the twins, the little (young) gods of war of the Hopi.

In the Hopi calendar the December ceremonial, *So-yal'-uñ-a*, the return of the Ka-tci'-na(s), like the Mexican Teotleco, the return of the gods led by the war god,† there are most interesting rites performed by the chief of the *Ka-lek'-to-ka*,‡ who is the living representative of *Pü'-ü-koñ-ho-ya*. This fact is significant, but it must be confessed that in the character of *Pü'-ü-koñ-ho-ya* there is only a part of the terrible conception of Uitzilopochli. He is now like Tetzcatlipoca, while *Ma'-sau-wûh* has some of the attributes of Uitzilopochtli and some of Iχcoçauhqui, the god of fire. In hostilities, as I have elsewhere shown, a priest personifying *Ma'-sau-wûh* is the first to appear; then follows *Ko'-ky-an-wuq-ti*, the spider woman, and then probably *Pü'-ü-koñ-ho-ya*, the little war god.

Cinteotl Itzlacoliuhqui appears in the feast of Ochpaniztli. Cinteotl (corn goddess) was the son of Teteoinnan and Itzlacoliuhqui, the God of Cold, possibly the same as the *Nu-vak'* or snow Ka-tci'-na of the Hopi. The terrestrial goddess makes the germs among the Nahuas Tonacacihuatl, who has in that respect an analogy with the Hopi *Mu-i-yiñ-wûh*. The Hopi deity

* I have followed the generally received opinion that Paynalton, the small god of war of the Mexicans, was simply a small, convenient statue, to be carried from place to place in time of war. Several Hopi legends tell of a similar custom in their wanderings of carrying their *poñ'-ya* with them in their migrations, not unlike the manner in which the Ark of the Covenant was carried by the Israelites.

† Tezcatlipoca is repeatedly mentioned as leading the Nahuas in their migrations, just as *Pü'-ü-koñ-ho-ya* has led the Hopi.

‡ The *Ka-lek'-to-ka* are warriors. See Jour. Eth. and Arch., vol. II, no. 1.

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Co-tok-i-nuñ-wa, or "heart of the sky," recalls in its meaning the *Quxcah* which Brasseur translates "Cœur du ciel" (Popul Vuh, pp. 8, 9). There are some likenesses between this Kiche divinity and Itzamna, which in turn recalls Tonacatecutli of the Aztecs (*cf.* Seler Caractère des Inscriptions Aztèques et Mayas, p. 89).

The Limax shell among the Nahuatl is a symbol of sex, and it was believed that as the animal emerges from the shell so the infant is born from the body of the mother. A univalve shell is esteemed by Hopi women to assist in parturition, and fragments of the haliotis are always hung in the middle of the forehead of dolls of *Ca'-li-ko*, the corn goddess, a personage having certain characteristics of Cinteotl of the Mexicans.

In a study of the mythological characters of the Hopi Olympus, care must be exercised not to mistake different names characteristic of attributes which may be applied to the same person. For instance, *Ko'-kyan-wuq'-ti*, the Spider Woman, it is said, can change her form at will, and possibly, if an earth goddess, does so, as shown by names given her. From a study of the few reliable stories which we have, it is not impossible that she and the two earth goddesses, *Mu-i-yiñ'-wûh* and *Ha-hai'-i-wuq'-ti*, are identical just as in Mexican mythology Toci figures under several names. It is quite natural to regard the Germ Goddess and the mother of the *Ka tci'-na(s)* as identical. *Ko'-kyan-wüq'-ti*, in the form of a virgin, was impregnated by the sun through a drop of water, according to a Hopi myth. Have we not here the widely spread legend of the impregnation of the Earth Mother, and is not *Ko-kyan'-wüq-ti* but another form of the Earth Goddess? I believe it will be found that such is the case, however stoutly the Hopi priests declare that their three personages are different.*

* In the *Pa'-lü-lü-koñ-ti*, *Ha-hai'-i-wüq-ti* and *Ca'-li-ko* are both represented (see Journal of American Folk-Lore, 1893): one gives food to the great plumed snake; the other knocks down the corn. Compare in this article the association of the plumed snake effigies and the sun symbols, and the connection of Quetzalcoatl with the sun. If Ca'-li-ko, the corn goddess, corresponds with Cinteotl, we would naturally find her associated with earth goddesses, for Cinteotl is by some identified as such. It is suggestive that in initiations an ear of corn is given to the novice as a symbolic representation of mother. The corn is the mother of all initiated persons of the tribe. What more natural than to suppose that the corn divinity is but another name of the all mother, the earth goddess? The identity of *Ca'-li-ko* and the other three earth goddesses is supposititious.

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Mr. A. M. Stephen, in his work for the Hemenway Expedition during the last year, has gathered much lore in regard to the *Na-tac'-ka(s)* which is not yet in a condition to be published, but one or two points which are suggestive may be mentioned. Attempts to determine the etymology of the word have thus far failed, and the word is possibly archaic or derived from the language of some other stock. Every new variant of the story of the birth of the little war god reiterates the statement that he and his twin brother were sons of the sun. Comparative folk-lore teaches the same. Who was their mother? Spider Woman may stand in that relationship, although she is called their grandmother. It is said, however, that Spider Woman can change her form at will, and it is possible that she is simply an earth goddess or the beautiful maid who was impregnated by a drop of water. The mother of the *Na-tac'-ka(s)*, who is also said to be the mother of all *Ka-tci'-na(s)*, is *Ha-hai'-i-wuq-ti*, and the priests likewise recognize *Mu-i-yiñ'-wûh* as the maker of all germs, the universal mother. I believe that these three personages are in reality the same, and that the reason that stories of them intergrade in such a perplexing way is that they are simply different attributes of a common parent, the earth goddess. If this theory is correct the many variants of the tale of the Mexican war god slaying his brothers corresponds in a remarkable way with the Hopi legend of *Pü'-ü-koñ-ho-ya* and the monsters, the giant elk and *Na-tac'-ka(s)*. The mother of the Mexican war god was an earth goddess who gave birth pathogenetically to Uitzilopochli, who destroyed her rebellious children, the Uitznaues. In the same way *Pü'-ü-koñ-ho-ya*, also miraculously conceived by a maiden, killed the monsters, sons of *Ha-hai'-i-wuq-ti*.

With legendary history exactness in details is impossible, and it is absurd to expect the same people, after they had separated into groups and lived a long time apart, to keep lore which was once the same, unchanged. The many variants of the story of the *Na-tac'-ka(s)* and Uitznaues are no greater than would be expected.

When, as sometimes happens, two chiefs of equal honesty tell the same legend with variations, we are led to conclude that it is impossible to harmonize them without resorting to other means besides human testimony. Legendary history from its

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nature is not accurate enough for a basis of scientific knowledge, yet comparative folk-lore may lead to important results. I am convinced, the further I study the Hopi folk-lore, that all theories built on such a shifting sand are too speculative to be accepted as science, for there is no way to prove that a legend has remained the same generation after generation. There is, on the other hand, evidence from the existence of variants that it has changed; but when this is said it does not deny the possibility of arriving at a conclusion by the light of comparative folk-lore.

While, however, it is possible to identify from legendary evidence or from the lore one of the components of the Hopi stock which may have brought the cult of the Plumed Snake from the far South, it must not be supposed that opiolotry did not exist also among the nomadic Northern peoples of Shoshonean and Athapascan stocks. It is of course important to learn whether the cult of the Plumed Serpent was present among these tribes. However this may be, undoubtedly it reached its highest development in Mexico and Central America, and it still survives among the Tusayan villages.*

The theory of a kinship between the Pueblos and the Mexican aborigines is as old as their discovery, and in many of the early accounts of the sedentary tribes of New Mexico and Arizona they have been called Aztecs. In the last year, however, it is positively stated † that the village Indians are not Aztec. The truth may lie between these extreme statements. The Hopi are not Aztec any more than some other peoples of Central America which spoke Nahuatl, or than others whose mythologies were closely akin to that of the "Aztecs." They never attain that

* To discuss the distribution of "Snake worship" among the aborigines of North America is a subject large enough to fill an entire volume. It is far from my intention to say that it is limited to Mexico or to our Southwest. Striking similarities in snake worship, whether found in the New or Old World, can be readily indicated. When these similarities are as close as that between *Ba'-lü-lü-koñ* and Quetzalcoatl, and when other resemblances in ceremonials and symbolism are so numerous, we are justified in supposing, even if snake rites existed in Arizona derived from other sources than Mexico, that these likenesses are important. Those of Arizona betray the influences of Central America; and however the resemblance came about, whether by exchange or not, the traces of the same snake cult exist in these two places.

† Without, it must be confessed, any new data.

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PLATE IV.—Ha-hai′-i-wüq-ti, Na-tac′-ka and So-yok′-ma-na.

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height of culture which is so evident in many Mexican peoples. Their buildings are almost wholly devoid of ornamentation, and, judging from the ruins, never were decorated with figures at all comparable with those of Yucatan. There is no evidence of the existence of glyphs or of an aboriginal literature, but the answer to the question of whether there are not traces of Central American culture in Tusayan is unaffected by these facts. From the ceremonial side there is accumulative evidence that the Hopi system at the present day has stronger affinities with those of Central America than with that of any of the nomadic tribes of North America.

The pueblos are frontier towns* of house-builders, not of nomads, and are peopled by the descendants of colonists from Mexico, mingled with other stocks, by which they have been more or less modified and changed; hence, while comparatively low in the stage of culture, there is still enough to indicate that there are relationships to Central America. It is not improbable that both Mexican and Pueblo cultures originated from a region in northern Mexico, developing, as environment permitted, in its northern and southern homes. The refugees to the province of Tusayan lived under adverse conditions to reach any high degree of culture. They have, no doubt, much in their religious ceremonials, their arts, and their language in common with the nomads; they have intermarried to a limited degree with those of a hostile stock, and symbolism similar to theirs, and stories of like import may be repeated in tribes of widely different modes of life. These were not the only agriculturists; the Indians of the northwest coast were likewise house-builders, but in a very different way; yet with all the similarities which may be pointed out, the Pueblos are still a distinct people among the aborigines of the United States, and

*I take it for granted that the many resemblances between the so-called Cliff-dwellers and the present Pueblos indicate that they are one and the same people and not distinct races, although at different points of contact with nomads the latter have been modified in different ways, leading to linguistic and some other differences. Racially, then, the Cliff-dwellers are the ancestors of those of the Pueblo culture to-day, but whether the Zuñis, Hopi, or Havasupai (Kohoninos) stand nearest in that development to the Cliff-dwellers, future research only can decide.

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their closest affinities are with the peoples of the Salado, those of Casas Grandes, and those of Central America, including Mexico. There is need of further observation to demonstrate the truth of this theory, for such only can it be considered at present; but it can hardly be doubted that new researches must lead to important discoveries in this direction.

EXPLANATION OF THE PLATES.

PLATE I.—Masks of *Na-tac'-ka(s)*.

Fig. 1.—Black *Na-tac'-ka*.
Fig. 2.—White *Na-tac'-ka*.
Fig. 3.—Yellow *Na-tac'-ka*.
Fig. 4.—*Wu-yak'-kwa-ti*.

PLATE II.—Disguise of the *Coyotl(s)* and *Papalotl(s)* (after Sahagun).

Fig. 1.—Complete figure of *Coyotl*.
Fig. 2.—*Çiltalcoyotl*.
Fig. 3.—*Tlapalcoyotl*.
Fig. 4.—*Chamolcoyotl*.
Fig. 5.—*Tlecoyotl*.
Fig. 6.—*Itzaccoyotl*.
Fig. 7.—*Xiuhcoyotl*.
Fig. 8.—*Tliltlcoyotl*.
Fig. 9.—Human figure with *Papalotl* tablet.
Fig. 10.—*Izpapalotl*.
Fig. 11.—*Tlilpapalotl*.

PLATE III.—Mexican ceremonial dress preserved in the Museo Arqueologico at Madrid.

PLATE IV.—*Ha-hai'-i-wüq-ti*, *Na-tac'-ka* and *So-yok'-ma-na*. (From a photograph kindly loaned by Mr. James Mooney, of the Bureau of Ethnology.)

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SUICIDE AMONG PRIMITIVE PEOPLES.

BY S. R. STEINMETZ.

It is the opinion of many sociologists, who perhaps have not given especial thought or study to the subject, that the act of self-destruction is infrequent among savage peoples. The purpose of my inquiry is to determine whether this opinion has the support of well-authenticated facts, and, if so, to what degree.

Von Oettingen (Die Moral Statistik, p. 762) remarks, that among torpid savages, as among the lower animals, suicide is said to be altogether unheard of. Corre, in his study of crime and suicide (Crime et Suicide, p. 349), is of the opinion that insanity and suicide increase in the ratio of the civilization of the races. Morselli (Il Suicidio, p. 205) expresses the same opinion, and adds the following statement of the motives of suicide among savages: I popoli selvaggi non si suicidanno se non per fame, come gli Australiani, Fuegiani ed Ottentotti, o per fanatismo, come gli Eschimesi, i Bengalesi e Giappanesi, gli Indiani e gli Incas, e gli indegeni del Malabar," etc. Unfortunately my collection of ethnological material, at the moment, does not include the African races, nor the primitive tribes of British India. In the second volume of my "Ethnologische Studien zur ersten Entwicklung der Strafe" is included my investigations of many other races of mankind.

I have been able to collect forty-two positive and three negative instances of suicide among primitive peoples, which are distributed as follows:

Polar peoples, 5; North American Indians, 14; South American Indians, 2; Bedouins, 2; peoples of the Caucasus, 3; native races of British India, 2; Melanesians, 4. (Codrington speaks generally of all the peoples he treats of in his work.) Micronesians, 2; Polynesians, 4; Indonesians, 5. The motives or the inducements to suicide are very varied. Among them I find the quasi-voluntary act of the aged, too often the result of a concealed coercion.

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Crantz (History of Greenland, pp. 166–194) mentions the instances of an old woman in Greenland, who, growing burdensome to herself and others, is coerced to throw herself into the sea to escape being buried; and of another who destroyed herself for fear of the accusation of sorcery, which is always followed by execution unless fortunately defended by some man of arms.

Nansen (First Crossing of Greenland, II, 330) relates that on the east coast of Greenland old men were killed by their friends or committed suicide.

The Athka Aleutians often destroyed themselves upon the death of a relative, but children were never known to commit suicide upon the death of their parents, although this was regarded as law.

Self-destruction among these people is also caused by shame; when an enterprise fails suicide is sometimes preferred to captivity or slavery. (Ivan Petroff: Report on the Population, &c., of Alaska, Tenth Census of United States, VIII, 158, 1884.)

Weniaminow (Charakterzüge der Aleuten von den Fuchsinseln) asserts that among the Aleutians of the Fox islands suicide is quite unknown; but as these Aleutians are closely related to the Athka Aleutians, the statement is quite curious and almost incredible, and becomes more so when contrasted with that of Klemm (Allgemeine Culturgeschichte der Menschheit, II, 201, 202, 1843), who says that "by threats the Kamtschadals and the Aleutians are brought to desperation and to suicide, to which they are extraordinarily inclined. . . . The easiest death is by drowning, which is preferred to hanging, and death by the knife. . . . So much are these people inclined to suicide that they kill themselves simply because they are old and invalid. . . . When Sarytschew traveled with Aleutians and they lost the hope of ever returning to their homes, one of them cut his throat;" and "formerly many when becoming ill begged to be thrown to the dogs while still living."

These statements of Klemm are very formal, the only authority given being Sarytschew; but because of the close racial connection existing between all Aleutians, and of the close agreement of these statements with those of Petroff, I am inclined to give to them greater credence than to the statements of Weniaminow. Besides, and in addition, I find what Klemm com-

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municated related in Steller's work (Beschreibung von dem Lande Kamtschatka, pp. 264, 273, 354) and in Kohn and Andrees, viz., that "the Kamtschadals regard suicide as allowable and even praiseworthy." They kill themselves for the least threat or scolding, and the incurable sick starve themselves to death. The motive for self-destruction is also often a great desire for the life eternal.

From Hall (Life with the Esquimaux, II, 101, 317) we learn that a Frobisher Bay Innuit woman killed herself, although she had a dependent daughter and believed that suicide is punished by the torments of hell.

Hearne (Landreis naar den Noorder Ocean, II, 186) relates that Matonabbee, a chief of the "North Indians," as he calls them, whom he praises as a most noble man, killed himself on hearing that the French had destroyed the English fortress where he had received his education, and adds that "no other Indian ever killed himself."

Among the Dakotas we learn that suicide is a common resort after every disappointment. In every season girls hang themselves because of jealousy or from fear of marriage to those whom they do not love. A beautiful instance of this kind of "love suicide" is contained in the well-known story of Winona (Mary Eastman, Dahcotah, 89, 169): "Among the Omahas the suicide of women for unrequited love is quite common." (*Vide* E. James' Account of an Expedition from Pittsburg to the Rocky Mountains, etc.)

The Mandan women sometimes kill themselves in despair from brutal treatment by their husbands and sons, and suicide for love or offended honor is not uncommon. The Chippewas never kill their old parents, but sometimes these abandon themselves to death. (Prinz zu Wied: "Reise in das innere Nord Amerika;" and Peter Jones: "History of the Ojibbeway Indians.") Keating, in his Narrative of Long's Expedition (I, 410, 411, 1825), assures us that suicide among the men of this tribe is not common, but occurs sometimes from disappointment or from shame after capture. Among the women it is much more frequent from the motives of jealousy, disappointed love, or loss of children. Public opinion regards suicide as foolish but not reprehensible, as in the future life it will not be punished.

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Charlevoix (Histoire de la Nouvelle France, III, 327, 1744) gives us an instance of a Huron maiden who killed herself because her mother reprimanded her; we learn from Gibbs (Contributions to N. A. Eth., I, 198) that among the tribes of western Washington and northwestern Oregon many women commit suicide from passionate sensual love at the death of their lovers; and from Lombroso (L'Uomo delinquente, p. 51, 1884) that the Creeks kill themselves after the slightest disappointment.

The Hidatsa believe that the self-murderer will live isolated in the future life, but will not be less well treated (Matthews "Ethnography and Philology of the Hidatsa Indians," p. 49, 1877).

"The women of the Talkotin of the Columbia river appear to be subject to depression of spirits arising either from sickness or from excessive labor, under the influence of which many commit suicide." (Stanilaud Wake, Evolution of Morality, I, 238.)

I will conclude my collection of North American examples by citing Th. Waitz (Anthropologie der Naturvölker, III, 102, 103), who says that "in the country of the Muskogee there is a 'lovers' leap,' a cliff from which two pursued, unhappy lovers once threw themselves into the river," and quotes Heckewelder and Tanner, who give instances of suicide by girls for unrequited love, and also by men from the same motive. According to Bossu, the self-murderer in southern Alabama is denied burial and is despised as a coward. Among the Cherokees suicide for grief caused by the disfigurement of small-pox was very frequent, and among other motives are found great calamities or losses, love, grief, and jealousy. An instance is given of a woman who drowned herself and children in the falls of St. Anthony because her husband took another wife.

Passing to South America, Waitz recalls the celebrated case of the South American Indian woman who, to escape falling into the hands of the Spanish, killed herself upon the grave of her lover, and whose sad and romantic fate has been immortalized in the verse of Del Bareo Centenera, and adds that among the Knisteneaux (Cree) it often happens that a wife sacrifices herself at the grave of her husband. Personally I have as yet been able to find but one instance of the practice of self-destruction in South America, that mentioned by Ochsenius (Chile, Land und Leute, 119, 1884) of the Araucanian girls who, when married against their wishes, hang themselves in the wood.

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At a great distance from Chile, among the Bedouins of Arabia, Burckhardt (Notes on the Bedouins, I, 279, 1831) reports a similar motive for suicide. Among the "Cheusurs" of the Caucasus only pregnant unmarried girls kill themselves, for the infamy is great, as the girls are generally most chaste, and the unhappy woman hangs or shoots herself. (Die Cheusuren und ihr Land, p. 88.)

Mr. Bell, in his "Journal of a Residence in Circassia" (II, 25, 1841), tells us of a Circassian slave who, on being betrothed against her will, killed herself, and Klemm (loc. cit., IV, 80) relates how the Circassian, surrounded by Cossacks and unable to escape, will run his yatagan into his breast.

In "Le Droit Pénal de la République Athénienne" (pp. 254–'5, 1875) we are informed that the Greeks cut off the hand of the self-murderer and buried it separately, as it was the instrument of a crime against the gods and the commonwealth.

Among the ancient Germans, on the contrary, suicide was not uncommon and was considered as the deed of a courageous and free spirit that brought the hero to Walhalla, while debilitated and very old men, who thought themselves useless in the world, often sought their death. (Fr. von Löher: Kulturgeschichte der Deutschen in Mittelalter II, p. 241–'2.)

Among the Jews, says S. Mayer (Geschichte der Strafrechte, 197 et seq., 1876). suicide was thought to be punished by God.

Upon the general subject Kovalevsky, in his latest work, remarks as follows: "Le suicide est regardé par quelques législations et la nôtre est de ce nombre, comme un délit particulier. Cette manière de l'envisager conduit à la mutilation des cadavres, on leur coupe souvent la main droite. Quelques législations anciennes, le droit Grec par example, en font foi. Lorsqu'il n'y a qu'une simple tentative et que le suicide n'a pas réussi on limite parfois les droits civils du coupable. Les Ossètes n'admettent pas ces principes, regardant le suicide comme un péché, ils se contentent d'ensevelir les suicidés loin des autres défunts, mais ils ne profanent ni leurs cadavres ni leurs tombes. Le plus qu'ils font c'est de lui souhaiter l'enfer lorsqu'ils passent près de l'endroit où le suicide est enseveli. La tentative de suicide, comme du reste toutes les autres tentatives, n'entraîne aucune conséquence juridique pénale." (Coutume Contemporaine et Loi Ancienne, pp. 326, 327, 1893.)

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Among the Burmese and Hos, and the New Hebrides, Fiji, and Kingsmill islanders suicide is well authenticated, and is caused by illness, grief, anger, jealousy, shame, humiliation, fear of captivity or misfortune, old age. and disappointed love; but among the western tribes of the Torres straits and the Andamanese it is unknown.

Kubary, who certainly has the profoundest knowledge of the Pelew islands, relates that suicide occurring very rarely, is neither praised nor blamed. It is the expression of the will of a free man, and public opinion interferes with it only so far as it affects the interests of a certain family. The self-murderer is considered insane as a consequence of disappointment in love or of uncontrollable jealousy or hatred; but having died an unnatural death their spirits are feared; an honorable interment is denied their bodies, which are buried as the corpses of those who fall in war, where they ended their life." (Die Verbrechen und das Strafverfahren auf den Pelau Inseln.)

In New Zealand an adulterer sometimes destroys himself for fear of the consequences of his actions, and in Tahiti and Tonga suicide occurs from love and grief.

Passing to the Indomerian archipelago we encounter the curious accounts of Borneo furnished by Wilken: The self-murderer is there thought to be isolated in the future life, like the thief; those who drown themselves are condemned thenceforth to live up to their waists in water; those who poison themselves to live in houses built of poisonous woods and surrounded by the ipoh (*Antiaris toxicaria*) and other noxious plants whose benumbing evaporations are painful to the spirits. (Het Animisme de Volken von het Maleische Ras, pt. 1, p. 44, 1884.) The eating of ipoh is followed by horrible spasms of the whole body, ending in lockjaw and death, and is frequently used for suicide.

The practice of suicide is also authenticated among the "Dajacks of the Doesson," Moeroeng and Siang, and among the Karo Bataks the spirit of the self-destroyer is worshipped. The aborigines of Nias believe that the spirit of the self-murderer, together with the spirits of those who die a violent death, are separated in the future life, and the people of Tonapo and Tobada (Central Celebes) frequently kill themselves when surprised by their wives in adultery.

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Consultation of a relatively great body of authorities show that among the Australian and wilder South American peoples suicide is unknown, but this appearance may deceive the investigator and prove an unsound basis for ethnological reasoning, because of the possible silence of the authorities upon this particular subject of inquiry.

Another impression derived will be that suicide in the next higher stage of civilization to that of the primitive peoples is not at all rare. Where it is the least rare is impossible to tell, but I am inclined to the opinion that it is most frequent among the Hyperboreans and the North American Indians.

In reviewing the causes which have led to suicide in the instances related, I find love, sorrow, and all related emotions as the motive in twenty cases, offended pride and sensibility in thirteen, fear of slavery and captivity in five, depression and melancholy because of disappointment, sickness, etc., in seven, family quarrels in four. The other motives are restricted to single cases.

The statistics of motives do not reveal any plausible theory by which the difference in the frequency of suicide in the various races occupying the same plane of culture can be explained. It is, however, interesting to observe that the motives are generally the same as those which lead to suicide in all civilized societies, quite contrary to Morselli's opinion above cited. In addition, it may be remarked that among the motives recorded offended pride seems to occur most frequently.

Regarding the moral consideration in which the act of self-destruction is held by primitive peoples, it will be observed that our information is in no sense complete.

In the instances above cited it appears that the Frobisher Bay Innuit, and Dakota peoples believe that the self-murderer after death is sent to hell; the Hidatsa believe him to be separated but not punished after death; the Chippewa that the act of self-destruction is a foolish but not reprehensible act and not punished in the future life; to the Ossetes it is a sin, and the subject is buried apart and condemned to punishment hereafter; the Karens call it cowardly and deny the self-destroyer honorable burial; to the Andamanese the act is a sin; the Pelew islanders neither praise nor blame it; the Dajacks are certain of its punishment after death, while the aborigines of Nias think

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the self-murderer only isolated in the future life, together with those who die a violent death; ancient Germans and the Kamtschadals alone considering suicide a praiseworthy act. It also appears that of the instances given, women have contributed by far the greater number.

In conclusion, it seems that a subject so interesting in itself and indicating so clearly the moral and intellectual development of the races of mankind is worthy of much more attention than is usually given to it by ethnographers, and it is a matter of regret that in so rich and suggestive a publication as the "Notes and Queries on Anthropology," by the British Anthropological Institute (ed. 1892, p. 146), there are so few questions in reference to suicide.

It seems probable from the data I have been able to collect that there is a greater propensity to suicide among savage than among civilized peoples, and that its frequency may be owing to the generally more positive faith in the future life existing in the former races which enables them to meet death with greater calmness and a slighter resistance of the instinct and other natural motives tending to conservation of life, and finally the question suggests itself that if suicide is one of the positive symptoms of moral degeneration, as Dr. Winkler suggests, is it possible that moral degeneration is taking place among the primitive peoples?

LEYDEN, HOLLAND.

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ERA OF THE FORMATION OF THE HISTORIC LEAGUE OF THE IROQUOIS.

BY J. N. B. HEWITT.

In his "Systems of Consanguinity and Affinity of the Human Family," page 151, Mr. Lewis H. Morgan, speaking of the league of the Iroquois, says: "As near as can now be ascertained the league had been established about one hundred and fifty years when Champlain, in 1609, first encountered the Mohawks within their own territories on the west shore of Lake George. This would place the epoch of its formation about A. D. 1459. . . . According to their traditions, which are confirmed to some extent by other evidence, they had resided in this area [the present limits of the state of New York] for a long period of time before the league was formed, and had at times made war upon each other."

This deduction is based mainly on traditions obtained from the Senekas and the Tuskaroras. In 1875 Mr. Horatio Hale* was informed by the Onondaga chiefs resident in New York state that "it was their belief that the confederacy was formed about six generations before the white people came to these parts;" they had met to explain to Mr. Hale their wampum strings and belts. Reckoning twenty-five years to a "generation" and assuming the "white people" to have been Hudson's men, in 1609, Mr. Hale reaches the identical date obtained by Mr. Morgan. Considering, however, how untrustworthy tradition is in matters of chronology, such exact accordance in results unsupported by historic records does not materially strengthen the probability that the date reached thereby is the correct one.

It is very doubtful that "twenty-five" years were ever considered as a "generation" by the Iroquois in computing time, but it is certain that they did reckon by the "length of a man's life," which may be assumed to be about 60 or 70 years; and it is not unlikely that the Onondaga chiefs in 1875 put forth a mere conjecture, not wishing to be thought ignorant of their past history;

*Iroquois Book of Rites, page 178.

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so that 360 or 420 years more nearly meet the requirements of the Onondagan statement than does Mr. Hale's 150, and of course an epoch for the formation of the league antedating 1609 by 360 to 420 years is not to be considered. It was evidently a blind guess of the genial chiefs.

David Cusick, the so-called historian of the Iroquois, who was undoubtedly conversant with the traditions of the Iroquois as well as with the so-called wampum records, says, in his "Sketches of the Ancient History of the Six Nations," that the confederacy was formed "perhaps one thousand years before Columbus discovered America;" but of course his reasons for this belief, as Mr. Hale aptly says, "do not bear examination."

It may be worthy of remark that the linguistic evidence found in Cusick's work shows conclusively that practically all the historical and traditional information put forth by him had come from the mouths of the annalists of the Five Nations or Iroquois proper, and not from Tuskarora sources. This is what would be expected, for the reason that the Tuskaroras, being an extra-limital people with regard to the Iroquois proper, could have had only a very general idea of the genesis and history of the league and its constitution and of the post-ethnic, mythologic, and legendary lore of the northern branches of the Iroquoian linquistic family.

Events which are known to have occurred between 1650 and 1656 appeared to Cusick and his informants to have been synchronous with the discovery of America, for he tells us that the Eries were conquered "about this time." Cusick wrote in 1825 and the defeat of the Eries occurred in 1656, or 169 years before; hence, Cusick by making the latter date synchronous with the discovery of America in 1492 places it 164 years too early. Here tradition with its wampum records is more than 160 years astray regarding an event so recent, comparatively speaking, as the overthrow of the Eries. In other words, the defeat of the Eries occurred 169 years before the time Cusick wrote, and yet he and his co-annalists err by 160 years regarding the date of that event. What then must be the confusion in tradition concerning a transaction which occurred perhaps 75 years earlier than the defeat and dispersion of the Eries?

It is thus seen that the dates of the formation of the league deduced by Morgan and Hale from oral tradition alone are un-

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trustworthy. Tradition alone cannot fix it with any degree of probability. The so-called wampum records are mnemonic but not chronologic, and so are not to be trusted to establish dates.

In considering traditional statements a distinction must be made between the tradition relating to fact or doctrine and the tradition relating to rites and ceremonies; the tradition concerning fact or doctrine, being handed down by word of mouth, is oral, and the tradition of rite and ceremony, depending largely upon observation for its preservation, is ocular. The relation of the most simple fact, as it passes from mouth to mouth, is distorted, and after a time becomes so changed that it has scarcely any semblance to its first form. But it is different with ceremonial observances. These are seized and retained by the sight, the most faithful and accurate of our senses. They are imitated until imitation becomes habitual; and habits when once formed are changed or eradicated with difficulty. Nothing is more certain than that many customs prevail among nations and communities for which they are wholly unable to account, their prevalence being due solely to traditional observance which does not concern itself with matters of chronology. This, then, is the difference between oral and ocular tradition. The fact or doctrine may be obscured or lost in the current of time, while the ceremony or outward observance of it is transmitted nearly or quite unimpaired.

The first mention of the Five Nations or Iroquois proper is probably that made by Jacques Cartier in 1535, when he mentions in some manuscripts the "Trudamani" or "Toudamani," and "Trudamans," who were evidently no other people than the well-known "Tsonnontowanens" of later writers. The latter was one of the names given the Iroquois by Huronian tribes in later times. Of the "Trudamani," Cartier asserts (in 1535) not only that they "do war continually among themselves," but also that "they showed us the skins of five men's heads spread upon boards as we do use parchment. Donnacona told us that they were skins of Toudamani, a people dwelling toward the south, who continually do war against them. Moreover, they told us that it was two years past that those Toudamans came to assault them; yea, even into the said river." Again, at Hochelaga, he was informed that "there be Agouionda, that is as much as to say, evil people, who go all armed even to their

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finger ends. . . . They gave us also to understand that those Agouionda do continually war one against another." The word "Agouionda" is evidently the Iroquois "oñkhiyo^{n}thă'," which signifies *they strike us;* hence *our assailants.* It is probable that one and the same people was designated by the words "Toudamani" and "Agouionda," and that this people was the Iroquois. He describes a state of desultory warfare between the people living on the St. Lawrence and the "Toudamani, a people dwelling toward the south." There is, however, no hint given of the existence of a league.

No league or confederation of peoples was perhaps ever formed without a sufficient motive in the nature of outside pressure. That the Hurons were in possession of the St. Lawrence watershed above and below the Saguenay river is evident from Cartier's narrative, for he met two hundred persons speaking Huron-Iroquois fishing at Gaspey. It is probable that the Iroquois were constrained to form the league to withstand the assaults of the Hurons and their Algonkin allies, for it is more than likely that such raids of the Iroquois as that mentioned by Cartier would provoke and incense the Hurons and their allies to seek means to avenge their wrongs; and we should find evidence of the existence of the league in a more aggressive policy of the Iroquois consequent upon their political union for self-preservation.

In 1622 Champlain was informed at a peace convention composed of Hurons, Algonkins, and Iroquois that these people were tired and fatigued by the war which had then lasted for "more than fifty years." Lescarbot, believing that "the change of language in Canada" was due to "a destruction of people," says, on page 170 of his Nova Francia (London, 1609), "For it is some eight years since the Iroquois did assemble themselves to the number of 8,000 (eight thousand) men, and discomfited all their enemies, whom they surprised in their enclosures;" and again, on page 290: "By such surprises the Iroquois, being in number eight thousand men, have heretofore exterminated the Algoumequins, them of Hochelaga, and others bordering upon the great river."

Thus it appears by the quotation from Champlain that in 1622 the war of extermination had then lasted for more than fifty years, going back to 1572 and perhaps 1560 as the date of its commencement.

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The exaggeration as to the numbers of the Iroquoian warriors recorded by Lescarbot was evidently put forth by the vanquished peoples, who consoled their vanity by assigning the cause of their defeat to the overwhelming numbers of their enemies rather than to a lack of courage on their part.

The foregoing citations, denoting a serious state of war, it seems to me, are indicative of a newly formed league, and make it probable that its formation was subsequent to the middle of the sixteenth century (1550). This inference is supported by tradition, and, small as is the value of tradition as a basis of scientific research, it is by no means to be despised as an adjunct. The Rev. C. Pyrlaeus, who was formerly (about 1744-1750) a missionary among the Mohawks, who lived long with the Iroquois, and who was well acquainted with their language, is quoted by Heckewelder, in his "Account of the History, Manners, and Customs of the Indian Nations," as follows: "The Rev. C. Pyrlaeus, in his manuscript book, page 234, says: 'The alliance or confederacy of the Five Nations was established, as near as can be conjectured, one age (or the length of a man's life) before the white people (the Dutch) came into the country. Thannawage was the name of the aged Indian, a Mohawk, who first proposed such an alliance.'" It is not an easy matter to assign a definite number of years to the expression "one age" in the foregoing citation, but, taking all things into consideration, I think that 60 years will be within ten years, one way or the other, of the historical value of the mooted expression, and we may assume, I think, 1609, in which year both French and Dutch were met by the Iroquois, as the probable date when the "white people came into the country," and by this reckoning we obtain 1559 as the most probable date of the formation of the league, which is deducible from the precarious factors now at hand.

Commenting on the identification with the Dutch of the "white people" mentioned in the citation from Pyrlaeus, Mr. Hale (Book of Rites, page 179), says that this "is probably wrong. The white people who first 'came into the country' of the Huron-Iroquois nations were the French under Cartier. . . . The presence of this expedition, with its soldiers and sailors of strange complexion and armed with terrible weapons, must have been known to all the tribes dwelling along the river,

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and would naturally make an epoch in their chronology." But it is doubtful whether the Five Nations knew anything definite about the Cartier expedition which had visited the territories only of their mortal enemies, for such knowledge could have come to them only by the vague hearsay of captives, and it is not probable that such precarious information "would naturally make an epoch in their chronology."

The inference from the presumptive evidence in our possession is that the "white people" mentioned by Pyrlaeus and either by him or by Heckewelder identified with the Dutch, were only a part of the "white people" who were first met during the year 1609.

Again, on page 180 of the volume cited, Mr. Hale says: "If when the Dutch first came among the Iroquois the confederacy had existed for only about eighty years, there must have been many persons then living who had personally known some of its founders." But we have no proof that there were *not* "many" such persons "then living," for the early Dutch were far more solicitous about profits of barter than for ethnologic data, and so it is not in the least strange that they have left us scarcely any trustworthy evidence regarding the institutions of the people with whom they traded.

"It is," he further says, "quite inconceivable that the cloud of mythological legends which has gathered around the names of these founders . . . should have arisen in so short a term as that suggested by Pyrlaeus." But, in the first place, it is overlooked that the founders of the league were all men reputed to be skilled in the arts of sorcery and the supernatural, and, secondly, that their language of statecraft dealt very largely in metaphor, allegory, and in striking symbolism, and, lastly, that common tradition, unhampered by written records, would, in attempting to eulogize the achievements of their heroes, in a short time transform such material into confused mythologic legends by confounding the acts and sayings of their heroes with those attributed to their gods.

Mr. Hale believes it improbable that in the brief period which has elapsed since the date suggested by the tradition recorded by Pyrlaeus "a fourth part of the names of the fifty [original, forty-eight] chiefs" forming the first council would have become "unintelligible or at least doubtful in meaning."

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In the first place, there is no evidence that many, much less a "fourth" part of the names mentioned have come to be unintelligible or doubtful in meaning, and, in the second place, it is very unlikely, though upon this point direct evidence is wanting, that a single name was specially coined at the time of the establishment of the league; so that it is quite probable that all the names may have long antedated the constitution of the confederacy; and they may have also inherited the prestige and tales springing from the heroic or other acts of their former possessors.

Lastly, in the legend reciting the events contemporary with the constitution of the league and leading up to its formation, the different tribes of the Iroquois are represented as dwelling in the same relative local positions which they held one to another when they first became known to transatlantic people. It does not seem probable that they could have held these same relative positions had the league existed since the middle of the fifteenth century. Successive migrations necessitated by their environment would have changed much the relative situation of tribal habitats one to another.

This examination of the arguments for and against the date of the constitution of the league suggested by the tradition recorded by Pyrlaeus makes it probable that this date was between 1559 and 1570.

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WORDS EXPRESSIVE OF CRIES AND NOISES IN THE KOOTENAY LANGUAGE.

BY A. F. CHAMBERLAIN.

Animal Calls.

The information contained in these pages is based upon notes made by the writer in the Kootenay district in the summer of 1891. The Indian, Amelū, who was "his guide, philosopher, and friend," seemed well acquainted with various animal and bird cries and calls and was able to imitate many of them almost to perfection. Horses and dogs he called by different sorts of whistling. The coyote or prairie-wolf is called up by a whistle somewhat like that employed for the dog. On the evening of August 10, when camped in the foothills, with scarcely a sound audible in the stillness that reigned, the Indian whistled "to wake up the coyotes," as he expressed it, and in a very few moments their discordant barks and howls were heard on all sides, and whenever they relapsed into silence he would "wake them up again." The same evening the writer desired to obtain a specimen of the brown bat (āqktlōm) of this region and asked the Indian to secure one. Seizing a long stick, the latter posted himself a short distance from the camp-fire, and puckering up his lips, drew them in with a peculiar sound, and soon had the bats fluttering about him, when it was easy to knock one down. To drive away dogs and other animals the Kootenays use the word *ā!* in contrast to the *tlū'nū!* and *yūwā!* used to children and other human beings.

Terms Expressive of Animal Cries, etc.

The expression *kīlā'tlōōk* (speak, talk) is used of most beasts, birds and insects. It is applied, *e. g.*, to the horse, mule, buffalo, cow, caribou, deer, elk, mountain sheep, mountain goat, mountain-lion, bear, lynx, cat, otter, weasel, muskrat, beaver, gopher, chipmunk, squirrel, grouse, duck, robin, canary, fly, horse-fly, mosquito, etc. Examples:

kītā'tlūōk pūs = the mew of the cat.
" k'k'ā'tlāqā'ɛtltsin = the neigh of the horse.

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kītā'tlūōk g·ō'tsāts = the chirp of the chipmunk.
" nū'p'kū = the growl of the black bear.
" wō'tāk = the croak of the frog.
" kīā'wāts = the scream of the "fool-hen."
k·ū'pi tsitltātlō'kinē = the owl (k·ū'pi) hoots. Here *tsitl* is a prefix of repetition or iteration.
tsi'tltātlō'kinē tō'k'uts kä'mɛnā = the bird chirps, chatters, sings very much.
tātlō'kinē tsā'i = the canary sings.
tātlō'kinē k·ā'nk·ūsk·ō'īk·āk = the mallard duck screams.
tātlō'kinē yū'wāt' = the hornet buzzes.
tātlō'kinē ā'qkōkō'wōm = the fly buzzes.

Of the fox and the skunk the Indians say they "never speak." In the animal-tales the fox and the mountain-lion are often represented as whistling—kā'tlūk·ā'qɛnē'yäm—to scare away the skunk, who is afraid of that sound alone. Of the dog and the coyote k·ō'wē (to bark) is used. The howl of the timber-wolf is rendered by *ōūō! ōūō!* and spoken of as *kī'tā'k·āntlūō'k kā'qkin*, the "howl of the wolf" (kā'qkin). The noise made by the grizzly bear is represented by—

qūiū ūqqū'! and spoken of as *ki'tāwas tlāūtlā* (grizzly).

The cry of the eagle (called *gīyā'kānū'k·ōāt*) is rendered by *sak! sak! sak!* The tomtit, the owl, the robin, and a few other birds are believed to speak Kootenay.

The noise made by the mosquito in buzzing is represented by *w'ūū! w'ūū!*

Human Cries and Noises.

"Chattering of the teeth:" *Gāk·ū'nānqō'mēk.* The word for "a tooth" is *ā'qk·ūnā'nām* (radical, *k·ū'nān*); the termination *-qōmēk* is found in various verbs: *hō'nāwāsqō'mēk*, "I sing," etc.

"Sneezing:" *K·ātē'inām; k·ā'tē* (he sneezes). This word is probably onomatopoetic.

"Whistling:" *Kā'tlūk·ā'q'nē'yäm.* Contains apparently the radical *tlōk*, seen in *kātlō'kinē*, "he speaks;" *-nēyäm* is a termination occurring in many verbs.

"Coughing:" *Kō'tstlūmā'ɛnäm.* Contains the radical *tlū'mā*, "throat;" "a throat" is *ā'qktlūmā'ɛnäm; -näm* is the ending of the general, indefinite noun.

"Kissing:" *Kā'tlkōk·ā'tlɛmā'q'nä'mnäm.* Compare the words

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for "mouth," *āqk·ā'tlɛmā'näm*, and for "lips," *ā'qkōk·ē'yōk·ā'tlɛmā'näm*.

"Snoring:" *Kātlū'kōk·tlē'tsinäm*. The word is derived from the radicals seen in *tātlō'kinē* (he speaks, makes a noise) and *kāk·tlē'tsinē* (he sleeps). "Snoring" is "making a noise in sleep."

"Laugh:" *Nōmā'tsinē* (he laughs); the radical is *ōmāts*.

"Cry, weep:" *Nētlā'nē* (he cries); the radical is *ētlān*.

"Shout, call aloud:" *Witlkī'nē* (he shouts). This word is probably derived from *witl-*, "big, great," and *kē*, "to speak."

"Clapping of hands:" *Gōtā'k'tlāiqō'mēk*. Contains the radical of *ā'qkāktlā'i'näm*, "palm of the hand."

"Clapping of hands on the thighs:" *Tū'k'pakqō'mēk*. Seems to contain the radical of *ā'qkikpā'kɛnäm*, "thigh."

Noises in Nature.

"Babbling (of a brook):" *Gā''kinōqō'nōkqō'mēk*. The word for "a small stream" is *ā'qkinōqō'nōk*.

"Noise made by a river:" *Gā''kinmi'tūkqō'mēk*. The word for river is *ā'qkinmi'tūk*.

"Noise made by a lake:" *Gā'kōk·ā'sūkqō'mēk*.

"Noise made by water in falling over stones:" *Gīyā'kōk*.

"Noise made when a stone is thrown into the water:" *Gākū'kqōtl*.

"Noise made by water in boiling:" *Gākā'māk·ō'k·ö*. Contains seemingly the radical of *ā'qkink·ō'k·ō*, "fire."

"Noise made by fire burning:" *Gā''kink·ō'k·ōpqō'mēk*. Contains the radical *k·ō'k·ō*, "fire."

"Rustling of leaves:" *Gā''kōtla'kpē'kqō'mēk*. Contains *ā'qkōtla'kpē'k*, "leaf."

"Echo:" *Nāmtlē'ël*.

"Noise made by the wind:" *Gā'kātlō'mē* ("the wind makes a noise"). The word for "wind" is *āqk·ō'mē; witlū'minē*, "there is a high wind."

Other Noises.

The word *skē'kiletī'tlēk* is applied to the tinkling of a bell; the noise made by tapping with a knife on a tin cup or piece of metal, or with a pencil on the hard cover of a book.

"The ticking of a watch:" *Gā'ktlitī'tlēk*.

"Sound of discharge of gun:" *Skī'kinkākī'nitl*.

"Sound of discharge of gun at some distanee:" *Kākī'nkākī'nitl*.

"Noise made in snapping a whip:" *Gā'k'k'mē'tlētī'ktcē*.

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CARIBBEAN INFLUENCE IN THE PREHISTORIC ART OF SOUTHERN STATES.

BY W. H. HOLMES.

Prominent among the problems that attract the attention of students of native American history is that of the origin and geographic mutations of the races or groups of men. Arts, institutions, and physical characters, ancient and modern, are studied with exhaustive care that comparisons may be instituted between the peoples of all lands, near and remote. Every gateway of ingress to the continent, every point of contact or approach of independent habitable areas, is examined and reexamined with the view of detecting traces of movements of men and art. Slowly yet surely our knowledge is accumulating and correct notions and sound general interpretations are prevailing, even though final determinations may not in many cases be within our reach.

Observing the geographic relations of the West Indies to the continents of North and South America, ethnologists have speculated as to the nature and extent of prehistoric intercourse between the peoples of the contiguous shores. The Arawak and Carib have been followed back and forth from the Antilles to the southern mainland, and evidences of Caribbean* occupation or influence have been diligently sought in Florida and along the Gulf coast. Cuba and the Bahamas are within easy reach of the mainland of Florida and intercourse must have been common, but up to the present time little definite information has been obtained with respect to it. Recent researches have led me to examine with great care the art remains of the southeastern United States, and some interesting facts have been developed which may possibly serve to assist in linking the mainland with the Caribbean islands by art at least, if not by race. For years I have noticed certain marked differences between the ceramic products of the Florida-Georgia region and like works

*The term Caribbean, as used in this paper, refers to the culture province, and not to a particular stock of people.

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found in the body of the country to the north and west, and have published some facts relating to the subject in earlier numbers of THE ANTHROPOLOGIST. In finishing and decorating their earthenware the ancient potters of this province employed stamps or paddle-like modeling tools, the faces of which were engraved with various designs, some simple and conventional, the imprintings on clay resembling closely the reticulated effect produced by applying the mesh of a coarse, open fabric; others quite elaborate, embracing figures more or less complex and often elegant, embodying curved lines in many unique combinations.



FIG. 1.—Design of Caribbean type from a vase found in a mound in Franklin county, Florida.

The impressions left on the vases are so partial and confused from the use of the flat stamps over and over again on the convex surfaces of the utensil that long and careful study was necessary for their full analysis. Finally, a number of complete or nearly complete designs were restored, some of which have been published.* An excellent example of these pottery-stamp designs recently obtained is presented in Fig. 1. The stamp was

* W. H. Holmes: THE ANTHROPOLOGIST, January, 1892.

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used in decorating a narrow collar encircling the neck of a globular vase from a mound in Franklin county, Florida. The impressions made were only partial on account of the flatness of the tool and the convexity of the plastic surface. However, nearly all parts of the design had at one point or another come in contact with the clay, and by combining the numerous partial impressions left, the entire figure was made out. The design proper is represented in the cut by the white lines, the interspaces being black; it is thoroughly characteristic of the South Appalachian ceramic group, although rather more complete and satisfactory than most of the others so far restored. Observing

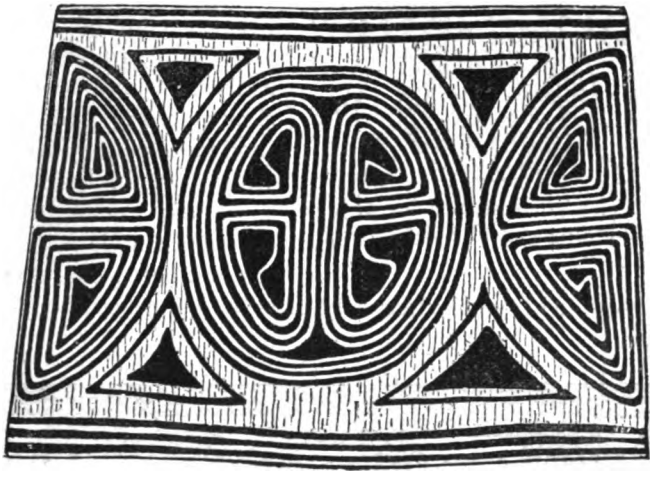


FIG. 2.—Design carved across the seat of a wooden stool, Turk's island.

the dissimilarity of these figures to the ornamental designs of the surrounding areas in the United States, the idea was suggested of comparing them with the decorative conceptions of the West Indies.

It happens that our museums are not well supplied with art remains from the islands contiguous to Florida; but the collections of Guesde in Guadeloupe island, Lesser Antilles; Latimer in Porto Rico, and Gabb on Turk's island, Bahama group, furnish numerous examples of articles decorated in what is thought to be the Carib style, and afford the desired opportunity for instituting comparisons. In the Smithsonian Report

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for 1884 Prof. O. T. Mason published illustrations of designs engraved on a remarkable wooden stool or chair obtained by Mr. Gabb from a cave on Turk's island, and two of his figures are reproduced here in Figs. 2 and 3. Neither of these figures exactly duplicates any of the Florida-Georgia designs, but comparison makes it clear that analogies in features of motive, grouping, and execution are remarkably close—too close certainly to have arisen save through identity or most intimate relationship, socially or sanguinously, of the peoples employing them. Another figure, also from a Turk's island stool, and shown in Fig. 4, embodies motives absolutely identical with those in the Florida specimen, Fig. 1, as will be seen at a glance. Such minor differences as do exist have resulted from the necessity of filling up spaces of different shape.

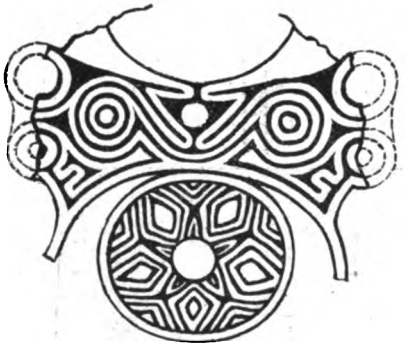


FIG. 3.—Design decorating face of a figure forming end of a Turk's island stool.

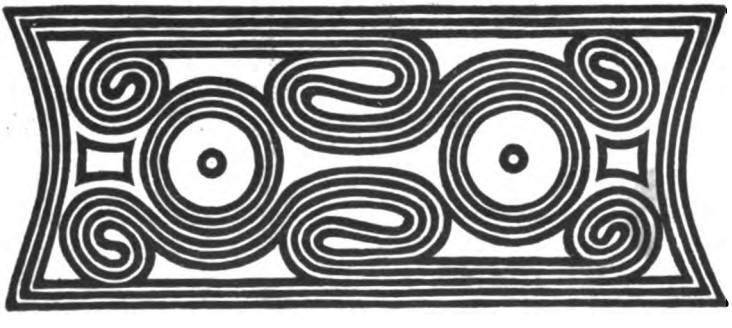


FIG. 4.—Design from the seat of a wooden stool, Turk's island.

The most striking characteristics of the West Indian decorative designs are complicated groupings of curved and broken lines and the filling in of areas and interspaces with concentric circles and angular figures. There are also peculiarities of

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arrangement of component parts of complex figures which suggest the influence of the conventional treatment of life forms so common in the art of the Antilles and the south shores of the Caribbean sea. The conclusion reached, after long study, that the resemblances of these figures to the Appalache-Florida work are too pronounced in character to be fortuitous is confirmed by the additional observation that the Turk's Island examples presented in Figs. 2, 3, and 4 are engraved or carved in wood precisely as were the paddle-stamp designs used by the potters of the mainland and precisely as are the less attractive decorations of the Cherokee potter of today. This confirmation is

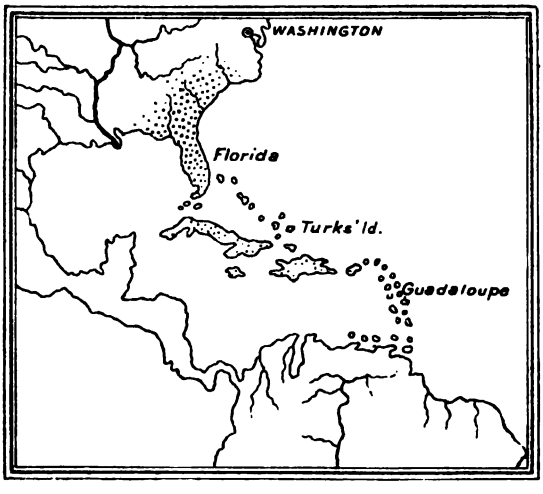


FIG. 5.—Sketch map showing the extent of supposed Caribbean influence on ceramic decoration in the southern states.

further strengthened by a study of the distribution of the supposed Caribbean features of Appalache-Florida art. These features prevail most fully and exhibit greatest individuality in those parts of Florida and Georgia most convenient to the Antilles, and followed inland they are found to gradually disappear in a broad field, furnishing decorative conceptions and treatment of totally distinct types. This distribution is indicated in the small sketch map presented in Fig. 5. The most northern traces of distinctive Caribbean treatment and motive are found

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in the valley of the Yadkin in North Carolina, near the Virginia line, and in the valley of the Tennessee near Knoxville; and the most western occur on the Gulf coast in southeast Alabama.

There is reason to believe, then, that the influence of Caribbean ideas was strongly felt in the ceramic art of the mainland, and the question arises as to the nature of the agencies by which this result could have been brought about. Did the Caribbean peoples moving to the north and west reach the mainland and occupy part or all of the vast area indicated, or did they originally occupy this province, passing, under the pressure of encroaching peoples, or through some impulse of migration, across the narrow stretch of sea to occupy the great groups of Caribbean islands? Or, rather, shall we surmise that their presence on the mainland was casual and occasional as in the friendly visiting back and forth of neighboring peoples or in the landing of expeditions for pillage and conquest, and that certain elements of their art were thus absorbed by the more primitive tribes of the continent?

It is well known that arts or features of art do migrate independently of the movements of the peoples to whom they belong, and it is true that they pass with especial ease and freedom from more advanced to less advanced tribes where adoption merely and not replacement is necessary. The proposition that the movement in this case was one of art rather than of people, and that elements of the well-advanced culture of the islands were adopted on the mainland by comparatively rude peoples, is supported by the following considerations: If the Caribbean peoples had originally belonged in or had taken permanent possession of the Florida-Georgia region they would have practiced their full range of shaping arts, yet among the remains of the region, so far as I know, no single implement or article of sculptured stone of strictly Caribbean characters has been found. Again, the designs in use by the potters of the south are to all appearances exotic. They have no analogues in the other arts of the province or in any of the arts of the remainder of the country. There is nothing in the simple art with which they are associated to suggest a possibility of their development within that art, and they bear every evidence of having been forced into uses and applied to forms and spaces to which they have a purely arbitrary relation. This can only

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be fully realized by a study of the hundreds of examples where elegant designs are applied in utter confusion as a means of texturing surfaces of pots or in filling in bands and zones so narrow that only small sections of the figures can be shown. They have no consistent relationship with the decoration of vessels and certainly no genetic relation with the art of the province so far as preserved.

Having formulated the above impressions with regard to so-called Caribbean influence in the art of the province, I proceeded to make inquiries as to other evidences of contact, and found that early explorers of the Florida coast regarded the frequent presence of the island peoples in Florida as a matter of course, and recent writers* have published many details tending to confirm the belief in frequent and familiar intercourse. Some authors mention the use of various Carib terms applied to places and districts in the Appalache country, and this fact, it seems to me, is especially worthy of note because such employment of words would strongly indicate not merely Caribbean intercourse but Carib occupation and dominance. This evidence, which may or may not be of value, is not supported by the ceramic testimony, the latter serving to indicate nothing more than an intercourse from shore to shore sufficient for the acquirement and adoption by the Floridians of certain features of decoration to the exclusion, apparently, of other features of durable art.

I have not attempted to show more than that the decorative art of the mainland was probably strongly influenced by the art of the Caribbean islands, the question of race not having been brought forward, but there are strong probabilities that the Antillean peoples concerned were of Carib stock. It may be observed that the three designs illustrated in Figs. 2, 3, and 4 belong to an island of the Bahama group, and that we cannot absolutely connect the relics—the particular wooden stools to which the ornaments belong—with the Caribs, but we find that these stools are Caribbean in style and have no analogues in the Florida region. The stone stools found scattered over the islands are identical in style with the wooden ones and have engraved

* Brinton, D. G.: Notes on the Florida Peninsula, 1859, pp. 96–98, 136. Gatschet, A. S.: Proc. Amer. Philos. Soc., XVIII, p. 465.

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figures of precisely similar character. It is also worth noting that Herrera records the use of such wooden stools by the inhabitants of the Island of Cuba. When a party of Spaniards was entertained by the inhabitants of a principal village they were led to "seats made of a solid piece of wood in the shape of a beast with very short legs and the tail held up, the head before, with eyes and ears of gold."* This is, so far as form is referred to, a perfect description of the Turk's island stools.

I may add that there is hardly a conventional linear design on the whole series of carved wood and stone articles derived from the Antilles and attributed to the Caribs that cannot be closely duplicated in the ceramic decorations of the Florida-Appalache province. It thus appears that we have here not the usual analogies of art resulting from likeness of human capacities and environment, or even the ordinary blending of features and phases of art always met with in the work of contiguous inhabited provinces, but striking identities in elements of embellishment, which elements are entirely at home in the art of one province, and exotics—mere wayfarers—in the esthetic wilderness of another. They are such identities as would result from the full adoption by one people of the ripened products of the art of another.

As to the period at which the arts referred to were practiced and at which interchanges are assumed to have taken place there may be no positive evidence, but all the historic circumstances within reach and many of the art conditions observed favor the view that the period, perhaps a long one, was that closing with the occupation of America by Europeans.

The ceramic products bearing evidence of Caribbean influence in Florida belong to the latest pre-Columbian times—the Timuquanan-Muskhogean period—while the earlier pottery, represented in what appears to be a middle period of shell-heap deposition, affiliates with phases of the art prevalent in the Gulf states beyond the limits of supposed Carib influence.

It may be mentioned that there are here and there in the art of the Gulf coast of Florida traces or hints of Yucatec ideas. Nothing has been found to indicate actual transfer of ceramic articles from Yucatan, much less of the planting of colonies

* Quoted by Prof. O. T. Mason, Smithsonian Report, 1876, p. 376.

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practicing the art. The exotic suggestions appear in the form and decorations of earthen vessels essentially northern in their fundamental characteristics.

Taken altogether the ceramic phenomena of the Southern states seem to indicate pretty much the degree of intercourse between the nations occupying the neighboring land areas as would be expected of enterprising peoples well enough advanced in maritime matters to navigate the wide straits with considerable ease, yet decidedly attached through long occupation to definite traditional seats of habitation; the tendency being under such conditions of association for culture elements to pass by infiltration, so to speak, from the higher to the lower culture groups.



FIG. 6.—Fragment of stamp design of Caribbean type from an Appalachian vase.

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INDIAN JASPER MINES IN THE LEHIGH HILLS.

BY H. C. MERCER.

Expeditions sent out by the University of Pennsylvania in the summers of 1891 and 1892 discovered or explored nine ancient jasper quarries in Bucks, Lehigh, and Berks counties, Pennsylvania. The outcrops of the well-known Indian blade material occurred generally in connection with veins of hematite and followed the trend of the Lehigh hills from the Delaware almost to the Schuylkill. Messrs. Charles Laubach and J. A. Ruth, of Riegelsville, had known the nine flake-strewn pits on Rattlesnake hill, about a mile from the Delaware, for several years, and the former called our attention to them in 1891.

The twenty pits at Saucon creek (Wieder farm, two miles west of Limeport, Lehigh county, Pennsylvania) were discovered by Mr. Laubach and myself in 1891, on following the clue of a farmer who described the dump-heaps as "Indian mounds." I discovered the ten diggings on the Mast farm, a mile and a half south of Limeport, in 1891. The existence of the sixty hollows at Vera Cruz, Lehigh county, Pennsylvania, had been suspected by Mr. A. F. Berlin, of Allentown, and his suggestion led me to them in 1892, to the one hundred and thirty-eight at and about the C. C. Miller farm, at Macungie (Lehigh county, Pennsylvania), on September 20, 1892, and to the five at Feuersteinberg (near Bowers station, Berks county, Pennsylvania) shortly after. I discovered the two pits at Coopersburg (Bucks county, Pennsylvania) and the twenty at Leinbach's mills (Berks county, Pennsylvania) in 1892.

All the diggings, except those at Saucon creek, Coopersburg, and Long Swamp, are at ill-watered and rather uninhabitable sites. The pits, save the larger ones at Vera Cruz and Macungie, are small in comparison with the Flint Ridge (Ohio) workings, while the chips, where cultivation reveals them, are coarse and the material comparatively intractable. "Turtlebacks" are very rare in comparison with the numbers found at Flint ridge and at Piney branch (District of Columbia).

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At Saucon creek some arrow-head workshops and a small mound in a neighboring swamp yet remain to be fully explored, but Macungie, explored in September and October, 1892, with its 108 pits and its half-wooded area of about six acres, will serve as a type of all the quarries.

The Possibility of Sink-holes.

Where there is jasper there is limestone, and where limestone, sink-holes. We were on the north slope of the Lehigh hills and hence overlooking the valley which, margined west by the Alleghanies and east by highlands variously named, stretches from New York to Alabama.

Rain-water, with its carbonic acid trickling through the jasper-bearing, clay-bedded magnesian limestone under our feet, had made caves, and their roofs had fallen in, so there were sink-holes in the neighborhood. Four small depressions of the surface, like large woodchuck holes among the tree roots, at the southwest corner of the quarries, lacking dump-heaps, looked like sink-holes, so that there seemed a chance that men had not dug the 108 holes outright, but had scratched upon the slopes of natural funnels against already-denuded jasper layers. But eight shafts sunk here and there in the pit margins through disturbed soil, charcoal, and refuse, sometimes reaching the undisturbed stratum of forest mould (as at shafts 4, 6, 10, and 11; see sketch map) and sometimes not getting below the disturbance (as at 7, 5, 13, and 9), satisfied us that the margins were not level as at the sink-holes but artificially piled-up heaps.

The shallowest dumps are at shafts 6 (3 feet) and 10 (2 feet 4 inches). Then comes 11 (4 feet 3 inches) and 4 (6 feet 4 inches), while at 5 there is no bottom at 8 feet 4 inches; none at 7 at 6 feet 4 inches; none at 3, at 7 feet; at 8, at 4 feet 4 inches, or at 9 at 5 feet. The small trenches 4½ and 6½ at distances of 60 and 30 feet from the pit margins showing no disturbance prove that the dumps did not extend so far. Moreover, a glance at the sectional drawings, taken from shaft 11 to shaft 5 (see map), demonstrates that in two cases, which fairly represent the measured instances, the cubic contents of the dumps equaled that of the holes; and we had done enough to prove that if we could have planed down the dumps to the original surface line the

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pits would have been about level. The depressions were therefore not sink-holes, but had been dug by men.

An Unsuspected Excavation.

But, as observed before, there were four small real sinkings, and the only way to explain them, and Mr. Miller's statement that they had caved down in the last ten years, and that plow-horses had become entangled in similar ones in the next field, was to follow down the deepest of them, 2 feet in diameter, 3 feet deep, and extending sidewise under the roots. Our shaft 12 (not given on the map) showed that for 14 feet down at this sink, and continuing 11 feet below its bottom, the yellow soil containing charcoal and chips has been disturbed. At 8 feet we encountered a limestone ledge and followed the traces of ancient work downward over its edge until at 14 feet these seemed to slope away diagonally out of reach of our shaft. If we are to believe James Garr, who stated that he sunk a pit in another sink about 30 feet farther to the west and found traces of disturbance to a depth of 40 feet, when he struck the limestone ledge above mentioned, we had worked into an Indian digging about 40 feet in depth and probably 100 feet in diameter that had been completely filled up by the ancient workmen.

But, without using Garr's testimony and refraining from speculation as to the real size of the pit, it is certain that the sink had fallen and we had worked through level ground already dug to an unknown depth, and whether the sink testified to a cave somewhere in the limestone below or a cavity left by the Indians as they piled in the transported earth, it told us certainly more than we bargained for and detracted nothing from the magnitude of the ancient labor.

The Diggings the Work of Indians.

Having settled that the pits are artificial; that notwithstanding the limestone in the neighborhood it is not reasonable to suppose that any of them could have been in part or wholly sink-holes (since every depression has its dump and the dumps are about sufficient to level the whole area); that inferably all of the pits had been more or less filled in with excavated earth

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by the quarrymen; that an area now level had been worked to a depth of 14 feet at least, and that finally it may be safe to say that double the work has been done suggested by the appearance of the surface, it remains to ask when and how were the pits dug and who dug them?

An old stump with 195 rings, on the side of a pit at Vera Cruz, and a tree nearly four feet in diameter cut down by Mr. C. C. Miller at Macungie in the bottom of a depression, would put back the abandonment of work in these two shafts to about 1680–'90; and that all are the work of Indians is proved by (*a*) two fragments of polished celts and one perfect and three broken arrowheads found by me on the edges of the diggings; (*b*) several small thinned-down blades found near the pits; (*c*) an arrowhead factory, where I found two fragments of finished arrowheads in the refuse, situated near a brook about three-eighths of a mile from the jasper outcrop; and lastly (*d*) by the fact that the material found and worked in the pits is jasper, a stone in continual use by early Indians, and worked fragments of which strew every village site in the Delaware valley.

The Method of Excavation.

Admitting, then, that no mysterious or unknown race made the pits, vast as the work is, but the Indian, once supposed incapable of sustained labor, the Red man of the grooved stone axe, polished celt, banner stone, and gorget, as encountered by Campanius and Kalm, the next question is, how was the labor accomplished?

This can be answered to some extent, but not fully, by a study of shaft 2, sunk down to the undisturbed bottom of one of the pits (see map and Plate 1). Lying on the unworked clay, at a depth of 18½ feet, was a large disc-shaped implement of chipped limestone a foot in diameter and well worn on its cutting edge.* At the fourteenth foot, among the refuse, a smaller tool, similarly worn, of quartzite and a rude point (of limestone) were found. While at the bottom again two cavities in the clay produced, on running in plaster of paris, the fac-similes of two

* I regret that I have been unable to publish illustrations of this and the other interesting stone specimens found in shaft 2; also drawings of the oven there discovered, and of the arrangement of layers in shaft 12.

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sharpened wooden billets (long since rotted away and leaving only their moulds), one about 6 inches in diameter and of unknown length, as the upper part was destroyed in digging, the other with a diameter of about 2 inches and 2½ to 3 feet long. (See Figs. 1 and 2.)

It is needless to go into details as to bark, twigs, slight charring at the ends, etc. The unique specimens now at the University of Pennsylvania's museum of American archeology speak for themselves. Granted that the Indian quarryman used copper tools not yet found, or pick-axes of deer antlers like the ancient flint-workers of Brandon, in England, can we suppose that he did not employ poles of various sizes charred, and sharpened like these with stone tools, both to scratch and delve the ground and



FIGS. 1 and 2.—Pointed wooden billets, showing work of ancient implements, recovered as plaster casts from bottom of excavation. Depth, larger, 17¾ ft.; smaller, 13½ ft.

pry up the bowlders? And so, whatever we say of the quartzite implement at the fourteenth foot, shall we doubt that the ponderous chipped disc, showing unmistakable marks of usage, was handled as a digging tool in the fine yellow clay on which we found it?

The ocherous clay, or decomposed diorite interbedded with the limestone, at Macungie, is often highly tinted with yellow, that at Vera Cruz is sometimes red, pink, and bluish. Manganese is abundant at both places, besides a talcose slate that cuts easily, when freshly dug, into pipes and amulets; but as yet

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we have no proof that the excavations were made or altered for any of these substances. Thus far the study of the quarries prove that jasper was the material sought, and the questions remain: In what state did the Indian find it? How did he take it from the earth, and how reduce it to his desired shape?

A shaft of the Durham Iron Company encountered a solid vein of red jasper under the Indian jasper quarries, at Rattlesnake Hill, at a depth of about 100 feet, and at Macungie Mr. James Garr says that he reached a solid yellow ledge of it in his shaft, sunk for curiosity, in one of the pits at 30 feet beneath the surface. But our shaft, since it did not reach the undisturbed edges of the old hole, did not determine that no ledge existed, though it did prove that nodules were frequent. These are found on the surface, varying in diameter from 2 inches to 4 feet, at all the diggings; and one, with its thick, silicious coat, about 3 inches in diameter, was excavated at a depth of 19 feet from the undisturbed clay at the bottom of our largest shaft. Sometimes partly chipped, sometimes untouched, these nodules are found scattered everywhere in the dumps.

Yet as they, and the chips and splinters that accompany them, here bear only a proportion of about 10 per cent. to the clay and are pretty evenly distributed through the mass, it is evident that the pits were to no great extent worked out of a solid ledge. If they had been, the constitution of the dumps would have betrayed it. We should have found more stone than clay in them. But we always found less, and very much less.

The evidence thus far indicates that after rolling away the surface nodules those lying deeper were pried up one by one with sharpened poles and the surrounding clay scraped away until the pits were made.

Traces of Fire.

Scattered fragments of charcoal were scarce in shaft 12 below the ninth foot, but all the other diggings and dumps were sprinkled thick with bits of charcoal. About 20 per cent. of the chips and 10 per cent. of the large blocks were reddened as if by fire, while reddened fragments were abundant in all the fire-places. Nothing was surer than that fire had played a great part in the quarrying process; but while four

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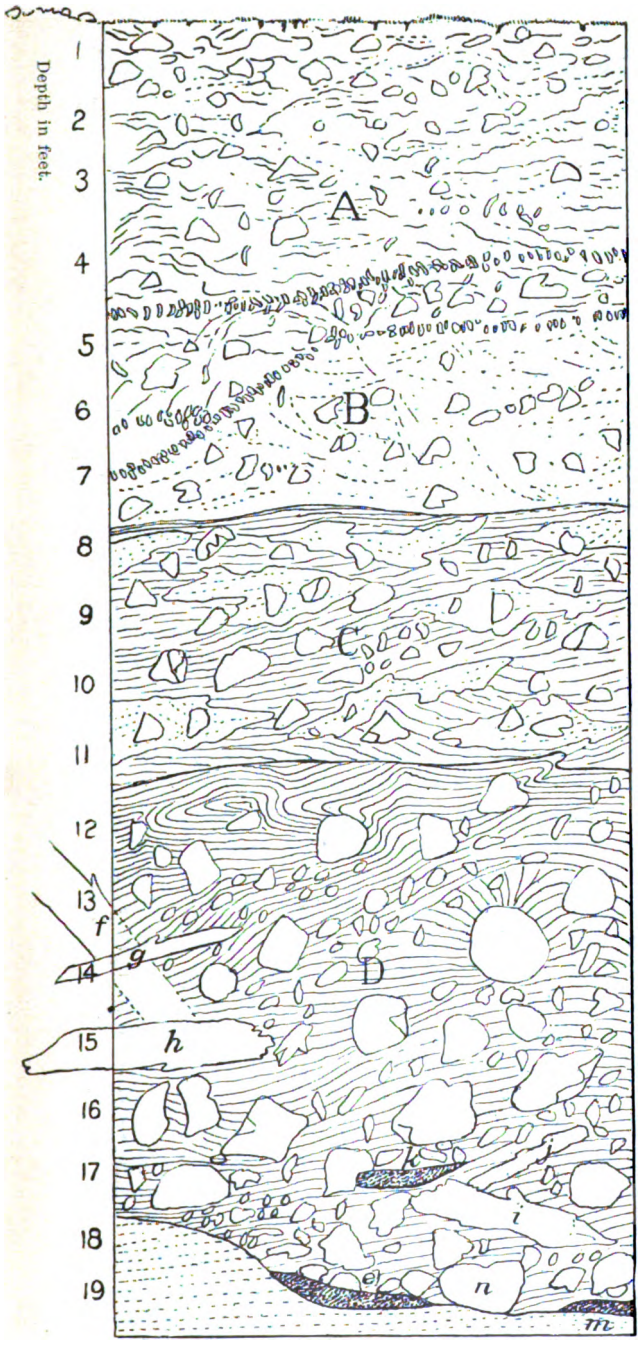
fire-places examined showed no trace of cooking, they also gave no sure clue to their purpose, and there would have remained a doubt whether the fires had not been built for warmth had not a fifth hearth discovered in shaft 2, at a depth of 15 feet, seemed to settle the question. It was an oven regularly built of blocks of jasper and contained a mass of charcoal and ashes (see Pl. I). The fact that the sides of the blocks were reddened, and several had already split through the middle, while the interstices were filled with fine splinters, offered conclusive evidence that the quarrymen had built the fire to fracture the blocks, which measured 2 feet, 1½ feet, 6 and 7 inches respectively in diameter.

My experiments proved (*a*) that if a large block of 2 feet in diameter is thoroughly heated on a wood fire it breaks into numerous pieces at a moderate blow; (*b*) that only the fragments near the fire are reddened; (*c*) that the fragments lose their original gloss by the process. The luster, however, seemed to be regained by long burial in damp clay, as was indicated by the high-polished fracture of some of the reddened chips found on the fire-places. Moreover, many of the worked forms gathered on the surface had been probably fire-reddened, and it is not unlikely that the Indian could have so heated the blocks as to reach their purer parts without spoiling the whole, while many of the large and coarse blocks might have been fire-fractured to get them out of the way.

The Transport of Jasper from the Quarry.

Lastly, what was done to the jasper after excavation? This brings us to the chips and refuse found in the shafts and on the surface. (1) In the large shaft 2, two leaf-shaped forms of jasper ("turtlebacks") were found at the eleventh and two were found at the sixteenth foot, none of them showing signs of use on their cutting edges. In shafts 5 and 7 I found hammer-stones at the first foot, in shaft 12 another at the fourteenth foot, and in the fields close to the pits 253 leaf-shaped forms and 55 hammer-stones. Certainly 70 per cent. of the hammer-stones were broken, a very few were made of sandstone, about 10 per cent. were of jasper, but most consisted of quartzite, or its equivalent, metamorphosed Potsdam sandstone, pebbles no doubt found in the beds of neighboring streams or

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A—Clay and loam, jasper chips and charcoal.

Jasper chips.

Jasper chips.

B—Yellow ocherous clay, mixed with chips, charcoal, etc.

C—Brown earth or loam, interlaid with masses of yellow ocherous clay like B; the whole mixed with chips, nodules, and scattered bits of charcoal; 11th foot, blocked-out jasper blade; also small jasper blade.

D—Dark-brown earth or clay, mixed with smaller lumps of yellow clay, jasper nodules, charcoal, and containing: *e*, *k*, *m*, fire-places; *f*, mould of tree; *h*, charred mould of tree; *j*, charred mould of branch; *i*, mould of tree sharpened at end (Fig. 1); *g*, mould of sapling sharpened at end (Fig. 2); and *n*, large stone implement; 16th foot, large quartzite "turtle-back;" also blocked-out blade of jasper; also small blocked-out blade of jasper; 16th foot, small piece of unio shell.

Undisturbed pure yellow and white ocherous clay at bottom, 18½ ft. down, in which one small jasper nodule was found.

PLATE I.—Section exposed on west face of Shaft 2, showing arrangement of refuse layers, fire sites, pointed wooden billets, etc.

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where on hillsides marine forces had rolled them since Laurentian times. Many of them were well battered and many so reduced by successive blows following one plane of their circumference as to have the characteristic appearance of heavy discs, while it is important to note that none of them, with two or three doubtful exceptions, are pitted on the sides.

The refuse may be divided into four classes:

(*a.*) Chips and fragments of no inferable design.

(*b.*) Rough leaf-shaped forms not betraying their artificiality in their fractures, but only in their comparatively great numbers. Had the Indian been pounding on argillite pebbles, the blows would have left their mark in a series of conchoidal fractures, and, as in the quartzite specimens from Piney branch, the marred pebble surface would have told the tale. But here the cross-grained jagged edges often explain little, and it is only after we have visited other jasper outcrops where no such fragments as these exist and convinced ourselves that frost does not even account for the chips, much less for the hammer-stones, in a word, after we have gathered these specimens by the dozen, thrown them away and picked them up again, that we are finally convinced, in spite of the criticisms of friends, that nearly as many blows have been expended upon them as upon the ordinary "turtleback," and that it is only the coarseness of the material that hides from us in these ruder instances the handiwork of man.

(*c.*) The "turtlebacks." About these there is no doubt. We need no context to settle their artificiality; each, big or little, vouches for itself, as do the similar forms in argillite and sandstone from the Delaware or Susquehanna beaches. Standing in a ratio of about 1 to 15 of the former class, they are not nearly as common as at Flint ridge and Piney branch. To gather the 153 that we found on six or seven occasions, varying from 1 to 5 inches in length, required careful, painstaking search; still they were there, and it is the question of their purpose that concerns us most. The Indian made them, either as finished or unfinished implements, for they may not be assigned to chance or symbolic use. We cannot, however, here use the argument that their mere presence proves their intentional abandonment, for, being as scarce as arrow-heads in an "Indian field," they might, like the latter, have been lost. All show design, all take

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the leaf-form, and all aim at a point and a cutting edge. That partly thinned blades occur among them proves here, as at the other quarries, that these jasper "turtlebacks" are inchoate Indian spears, knives, or scrapers, unfinished, rejected, or lost; but which were "rejects," and which were lost, which were too cross-grained to be thinned down, and which were not, we leave to the Indian now living, who forty years ago was making stone arrow-heads on the Sacramento, to tell us. The point is almost immaterial; the main fact remains that all obviously are steps in the process of fashioning.

(*d.*) The thinned-down blade, still very rude but of recognizable Indian pattern, of which we found 29 specimens, 7 were were only fragments, 4 would have measured 5 inches in length and done for large spears, 14 would have worked into arrow-heads. There was nothing like a buried cache of blanks to prove exactly how far the chipping work was carried at any one time at the quarries or that it always stopped at the same degree of finish. Sometimes it may have been large or small thinned ill-worked blades that were bundled up and carried off; sometimes pressure-finished knives or spears; sometimes back-breaking loads of "turtlebacks" themselves, heavy but still workable; while that the Indian sometimes carried away still heavier raw lumps is proved by a mass of native brown jasper weighing eight pounds found on the village site of upper Blacks' Eddy, ten miles from the nearest (Durham) quarry, and a smaller fragment noticed at the Frys' Run site, about five miles from the Durham diggings. On the other hand, two perfect arrow-heads of jasper and a curious notched jasper form (which I suggest was used instead of the notched bone in the finer chipping) found close to the pits seem to prove that the process was sometimes completed there, while two broken quartzite arrow-heads, a third of argillite, and a fourth of quartz point to material found and work done elsewhere. But granting all this, the immensely greater proportion of rougher forms places it beyond a doubt that the rude preliminary work above described and little else characterized the immediate quarry sites.

That the traces of thinned blades were so much rarer than the "turtlebacks" in the refuse was doubtless because they had reached a stage when they were more valuable to the maker, and when they would have been discarded far less often than the

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rough half-tested forms. That they represented the later steps in the work of which the "turtlebacks" were the beginnings, there could be no doubt.

A few blows of the pebble-hammer gave us the rough, leaf-shaped profile; others more careful and probably dealt with the smaller hammers produced the unmistakable closer chippings all round; then, if the mass, ceasing to be tractable, were not thrown away, still finer work—possibly pressure, was applied until the "turtleback" was thinned down to the last-mentioned form—which already in some cases as well finished as the stone knives found in Arizona cliff dwellings, still lacked the final notching and finishing touches to specialize it into a completed spear.

The Quarries as Places of Habitation.

Quarrymen dwelt at the diggings for prolonged intervals—must have done so. How can we doubt it when we consider the amount of work done, which, at Macungie, may be roughly estimated at one million cubic feet of earth excavated and carried from pit to pit. On the bottom of one of the shallow pits at Durham I found the jaw and teeth of a deer mingled with charcoal and ashes, and, as the quarrymen must have eaten while they worked, similar fire sites must exist at Macungie. The three fragments of polished celts above mentioned found with the refuse, the four arrow-heads of foreign material and a fragment of unio shell found in shaft 18, attest habitation, and no doubt systematic search will discover pottery and all the other traces of regular Indian occupation near the pits.

Yet, admitting all this, when we consider how scarce these relics are and realize the position of the quarries, sometimes on high slopes and frequently in exposed positions and removed from the spring, that desideratum of the Indian village, we see plainly that they were rather mining camps than village sites.

Resemblances of the Quarry Turtleback.

But the study of these quarries brings us beyond the bounds of Indian archeology and the interest that clings to their flaked stones lies not in what these are, but what they can tell us about the flaked stones of other ages and peoples.

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The chief thing to be noticed about them is, and recent discussion has impressed the fact, that they resemble the so-called implements of alleged older peoples in the Age of Stone.

They look like Trenton specimens, like certain European neolithic quarry specimens (Spiennes and Cissbury), like certain among the Somme, Thames, Marne and Onse valley specimens, and when we have realized this we see that the important thing about quarries all over the world is not the "turtlebacks," for they seem common to many and characteristic of none, but the resultant blade for which the "turtlebacks" were made.

Fortunately we can find—if we look hard enough—arrowheads (Flint Ridge, Saucon creek, and Macungie); pitted hammerstones (Gaddis' Run), pointed wooden billets (Macungie), polished celts (Macungie and Grimes' Graves), pottery (Spiennes), and fossil bones (Abbeville), at such places to tell whether they are the workshops of North American Indians, of the Neolithic celt-makers of Belgium, or of the Drift Men of France and England, but outside of these culture and age tests we find a site marking difference of *result* aimed at in the different workshops named.

At Spiennes the "turtleback" turned to a celt; at Abbeville, if it turned to anything, to a *coup de poing;* at the North American quarries to a cache-blade spear or arrow-head, while, if we could see the Mount Hope greenstone quarry or the Gippsland River-bed workshops in Australia (R. Brough Smith's "Aborigines of Victoria," p. 378), we should no doubt see it again fading into the so-called "tomahawk."

While, then, in three epoch-denoting classes of workshops—European drift, European neolithic, and North American Indian—we have the "turtleback," we must allow that the fact that a thing is a "turtleback" is neither for or against its antiquity. Bereft of its fellow-specimens from the quarry or workshop, wanting therefore a clue as to the intent of its maker, without geological horizon or associated relic, it must remain dateless and unlabeled.

Returning to the Lehigh Hills' quarries, a study of their topography makes us believe that the Indian dwelt some time in the valley of the Delaware before he discovered and worked them, and meanwhile as an inhabitant of the larger streams, chipped blade material in the form of beach-exposed pebbles. The recent discovery of argillite quarries at Gaddis Run, on the Delaware,

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in May, 1893 (after the preceding pages were written, *i. e.*, in November, 1892), and the study of the neighboring river shores seemed to divide the large group of argillite "turtlebacks" there found into two classes—those of the quarry and those of the riverside, distinguishing between quarry chipping places, where "turtlebacks" were made at a late period of Indian occupancy systematically and by skilled workmen from material excavated inland, and riverside chipping places of an older time, where "turtlebacks" were made along the riverside from surface material there at hand.

And these riverside workshops it was which, when we came to push investigation abroad and into earlier geological horizons, seemed analogous to the specimen-bearing sites of the drift.

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PRIMITIVE COPPER WORKING: AN EXPERIMENTAL STUDY.

BY FRANK HAMILTON CUSHING.

At a meeting of the Anthropological Society of Washington, held November 15, 1892, Mr. Warren K. Moorehead read a paper on "Singular Copper Objects from Ancient Mounds in Ohio." These objects were described as discovered by himself in great numbers in the so-called Hopewell group of mounds, while conducting explorations for Professor Putnam of the Anthropological Department of the Columbian Exposition. They consisted mainly of numerous figures, large and small, made of sheet copper. Many of them showed outlines and open-work cuttings of surprising regularity, neatness of finish, and intricacy of design. The plate-like figures were of nearly uniform thickness, but the thickness of individual specimens slightly varied. Although these specimens exhibited characteristic Indian modes of artistic treatment, it was thought that a primitive people like the so-called mound-builders, being unpossessed of a knowledge of smelting or of tools of iron or steel, could not have fashioned plates of such size and uniformity as many of those from which these objects had been made, merely with implements of stone. It was also believed that such a people, even if possessed of large, thin plates of copper, could not have cut them into patterns so elaborate, the lines of which were often as curved and complicated, yet as clean as scroll or stamped work. It was therefore suggested, in the discussion which followed the presentation of Mr. Moorehead's paper, that these objects were perhaps of European manufacture or, granting the art-work on them to have been native, that the copper plates from which they had been cut must have been of foreign make, since such large thin sheets of metal could only have been wrought by means of roller mills or stamping machines of hard metal.

Having practically and thoroughly learned the art of metal-working as practiced by the Zuñi Indians, having often seen and helped them make perfectly uniform plates as well as extremely

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thin sheets of copper and silver by alternate hammering and annealing, then grinding with sandstone, first one face, then the other, to form uniform leaves of the metal, I joined in this discussion, representing that, whether foreign or not, none of the forms described by Mr. Moorehead were impossible of production by a people actually limited to the resources of the stone age, as the builders of these mounds are known to have been. To this statement Professor McGee, in summing up the first part of the discussion, as presiding member, was inclined, from personal experience in metal-working, to agree; but it was objected by others that the mound people could hardly have possessed a knowledge of annealing, so essential to the process of copper-beating, etc., as described by me. Thus the question was left indeterminate.

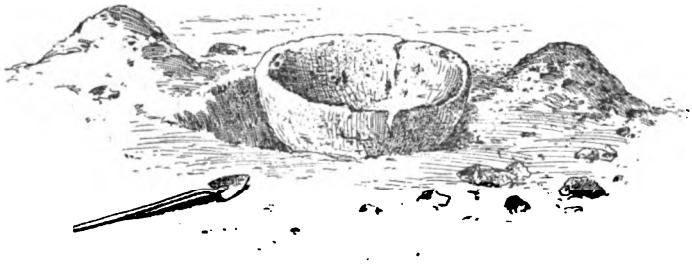


FIG. 1.—Ancient furnace exposed by excavation.

Being aware that the annealing, fusing, and soldering or brazing of soft metals was known and practiced throughout a large area of the Southwest prior to European contact, I did not question that annealing, at least, was also known to the mound-builders. Methods of prehistoric metal-working in the Southwest, with examples of which I am acquainted, may be briefly referred to in this connection. I have found evidence that ore rich in scales or seams of copper too minute to be useful in the native state, was there quarried, and first roasted in an open fire, then baked, so to say, or partially smelted in a kind of subterranean funnel-shaped oven-furnace or kiln (Fig. 1) terminating at the base in a round, nearly flat-bottomed pot or relatively small pocket (Fig. 2). Smelting in this kind of furnace or kiln was accomplished by introducing only a small quantity of the ore at a time, surrounding and covering it with fuel, firing and

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replenishing the latter until fusion resulted.* On cooling, the mass of cinders, slag, etc., was raked out, and the copper or other metal culled from the pocket at the bottom of the kiln, where it occurred in buttons or irregular nodules. I have examined and excavated several such prehistoric oven-furnaces as above described and figured, especially near ancient copper quarries or pocket mines on the southern border of the Salado valley, Arizona. Except that they invariably possessed terminal pockets and contained an excess of slag and charred greasewood, they in nowise differed from the many true ovens found in the same region in connection with the ruined pueblo-cities of the contiguous valley-plain. In fact, it may be conceived that the crude art of smelting here referred to might easily have been discovered through the earlier practice of the Pueblo peoples of pre-

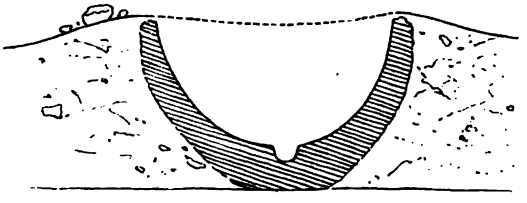


FIG. 2.—Section of ancient furnace, undisturbed.

serving food or rendering green-corn, mescal, and various roots palatable, by means of stone-baking in great underground oven-kilns. Even in the food-kilns near the ruins, used apparently only for cooking, the heat was sometimes so excessive that, combined with the natural alkaline flux of the soil in that region, it caused stones (although specially chosen for their comparative infusibility) to fuse into large slag-cemented masses.

In order to test my archeological observations and some vague

*On reading this manuscript to my learned friend, Mr. Walter William Palmer, a mining engineer of many years experience in Mexico, he informed me that the Indians of the sierras in Sonora and other parts use semi-subterranean ovens almost precisely like those discovered by me in the Salado valley, and that in smelting with these furnaces very dry twigs of greasewood only are used as fuel, the fire being closely watched and evenly replenished until fusion takes place. In this way they smelt even the sulphur ores of copper and silver with entire success. The presence of greasewood charcoal in the Arizona furnaces may therefore be taken as fair evidence that they were used, as I have suggested, for reducing ore.

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Zuñi traditions regarding this method of reducing ore, I once gathered, while traveling through a portion of the Zuñi mountains, several stones showing traces of clear copper. Making a large fire in a hollow (dug there in former times by Indian turkois miners), I cast the rocks into the middle of it, gradually increasing the fire until the stones were aglow with heat, and, keeping it up for some hours, allowed it to die down. Afterward, on raking the embers and ashes away, I discovered several small buttons of copper. This almost natural kiln was far less perfect than the primitive oven-kilns above described, yet the experiment was a demonstrative success.

The primitive Pueblos worked nodules of copper thus obtained by alternate hammering and annealing. There is evidence further than this, that the more advanced of these peoples, whose southerly remains I exhaustively investigated while conducting the Hemenway explorations, were possessed of a knowledge of hardening copper with silex introduced by a combined process of manipulation and annealing; that they sometimes fused together very small buttons of copper over hollowed stones to form ingots or slugs for their larger hammered work, although they do not seem to have cast other objects; and that they understood what I may term ember-brazing, whereby separate small parts of ornaments and bells were joined together without the aid of fusible alloys or solder. Studying specimens indicating all of these processes, I began, while still in southern Arizona, and have since carried to successful completion, experiments in them all, with purely primitive appliances and resources like those common to stone-age peoples, and in the open field only. In other words, limited by stone-age conditions and surroundings, I have succeeded in hardening copper by the introduction of silex as described, in casting ingots by fusing the metal in an open fire over grooves cut in a flat, concave stone, and in joining small bits of stone-hammered copper, both by ember-brazing, as I have called it, and by rivet-hammering or a sort of metallic interlacing with filaments or rivet-like bits of metal. Once understood, all of these methods of metal-working are extremely simple so long as the operator confines himself strictly to the use of stone implements, etc., for most of these methods were discovered through such usage, and, indeed, *entire* success in them seems to be dependent thereon.

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I have here parenthetically introduced the subject of Southwestern metallurgy, which I shall further treat of in a later paper, in order to call attention to facts not generally known or believed, and to evidence how far the most advanced of our aborigines north of Mexico had carried the arts of metal-working with means at their disposal as limited as were those of more northern and eastern peoples.

In the simple hammering, grinding, embossing and cutting of native or of nodular copper as suggested by the mound specimens in question, I have also made experiments, the partial history and results of which may properly be more fully recorded here as bearing upon the above-mentioned discussion relative to art remains from the mounds of the Mississippi and tributary valleys, as well as on the problem as to whether or not the contents of these mounds could have been of purely aboriginal design and of stone-age production.

In these experiments I have been guided alike by my experience in working silver according to the methods of the Zuñis, and by my practical knowledge of other arts as practiced by them and other Indians.

It is safe to assume, as a general proposition, that no new art was ever practiced by aboriginal Americans as strictly *new*. No art, I mean, in the working of new or unaccustomed material, which was wholly uninfluenced by arts and methods which, in connection with other materials more or less like the new material, had been practiced before. Thus I am led, by the experiments related below and by other considerations, to suppose that the simpler of the aboriginal arts in metal were at first influenced by more than one antecedent art, namely, not only by various methods of stone-working, but also of bark-working, skin-working, horn-working, etc. That the characteristics of the softer metals and the Indian's conceptions of, as well as his uses for them, would naturally associate them with such materials (and thus with their manipulation) need not be specifically demonstrated; yet, as illustrating this and at the same time indicating the antiquity of metal-working in the Southwest, some Zuñi names of metal may appropriately be analyzed in this connection.

He'-we is the general term for metal. It is derived from *he'-sho*, wax, pitch, or resinous gum (*he'* signifying wax-like in the sense

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of being fusible), and *a'-we*, stones—"fusible-stones" or "fusible substance of stones." The Zuñi name for the copper of commerce is, however, *te'-si-li-li he'-we*, "ringing vessel metal;" their name for native (unalloyed) copper is *he'-shi-lo-a-we*, pitch, or fusible red stuff of stones. This indicates not only that copper was known to the Zuñi ancestry before its introduction by the whites (in the shape of vessels, etc., so well made as to ring), but also that it was discovered, probably as I have heretofore suggested, not in native masses but as a substance fused, at first accidentally, from stones, and was hence named practically "the gum or pitch of stones;" and it also indicates that copper was conceived of as a kind of stone or stone material, yet as partaking in color as well as consistency (modifiability) of the qualities of pitch or waxen substances, such as the fire-cement for lacquer-like work, made of pitch and the gum of the greasewood (*Larrea mexicana*) and used for coating baskets, inlaid work, etc. As the words descriptive of raw or moistened skin, horn, etc., when in the state of softness induced by heat, also refer to this wax-like quality, it will be seen that the association extended still further. This, too, is shown by another term as applied to sheet-metal, which, when very thin, is alluded to as *ke'-pis si-ne*, or "skin-thinned," precisely as a thin plate of horn or a hammered piece of parfleche or rawhide would be; and it will presently be seen that the processes of working skin to make it thin, yet stiff and flat, as well as for shaping and embossing it in this condition, were applied or might have been applied almost directly to the working of malleable and annealed or fire-softened metal in sheets.

If, then, it may be reasonably inferred that the mound-builders were possessed of a knowledge of annealing, the significance of these facts and of my experiments as in part suggested by them will be made more obvious. That the mound-builders must have been possessed of such knowledge may be inferentially assumed from the above, and is still more strongly evidenced in other ways.

1. In the working of shield-hide, parfleche, and horn, as well as in the straightening of arrow-shafts or the bending of saplings, not only was heating (practically suggestive of annealing) constantly resorted to by almost all Indian tribes, but also by the use of perforated horn or bone plates and burnishers of horn or bone (themselves worked by fire-softening) in these simple arts, the

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essential properties of the draw-plate and burnisher for metal were discovered long before metal itself was.*

2. In the seventeenth century tribes on the Ohio were found still using small rude rods of copper for piercing pearls, horny substances, wood, etc., by heating them to redness and thrusting them through the objects to be perforated.

3. Numerous mortuary altars have been found in the older mounds covered with articles of copper which, having been sacrificed in fire, were fused together in many instances, and in some cases were so thoroughly melted as to form almost homogeneous masses.

4. It is not a little surprising that those who have supposed these ancient copper-workers of the north were confined to cold hammering, have not reflected that fire was used in nearly all the Lake Superior mines or quarries, whence the copper was chiefly derived, in the same manner as at Flint ridge and in western New York in the quarrying of flint from limestone, for the removal of copper from its rocky matrix. Fire also was occasionally employed to burn away or disintegrate small portions of rock when found adhering to bowlder or drift copper, as shown by a specimen I have seen from Wisconsin.

It seems to me improbable, indeed inconceivable, that a people using fire in connection with copper and the working of similar materials in so many ways as these, should not have become acquainted almost at the outset with its value for softening (as well as in at least partially reducing) metal, even had not the

* Draw-plates made from the scapulæ of deer were formerly used by Zuñi and other Indian metal-workers of the Southwest in forming silver and copper wire from slender hammered rods of those metals. The holes in these draw-plates were very numerous and nicely graded from coarse to fine, and wax mixed with tallow was freely used to facilitate the passage of the rods through them. The rods were not, however, unless very slender, drawn through merely, as in our corresponding operation with the steel draw-plate, but were passed through by a combination of pushing and pulling, accompanied by a twisting motion, just as arrow-shafts are rounded and straightened in a perforated horn plate. That these bone draw-plates were the direct descendants of the perforated horn arrow-straightener cannot be doubted. I am told that the Sierra Indian filagree-workers of northern Mexico also use such plates, made from the scapulæ of sheep, and with a like bone implement I have myself succeeded in making copper wire as fine as coarse linen thread.

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liable accidents of daily life in the use at first of cold-fashioned articles of the latter material made them acquainted with these properties.

In copper-working, then, to reproduce with stone-age appliances the objects under discussion, and thus to ascertain whether they were prehistoric, and, if so, to relearn the actual methods by which they were made, I have not hesitated to freely use fire for softening my slugs and plates of metal; and in drawing out sheets by hammering with stone bowlders or mauls I have, for like reasons, simply employed the methods used by the Zuñi and other Indians in hard-dressing skin, horn, and like modifiable materials.

When these peoples thus dress a piece of rawhide they lay it upon a very smooth, flat, but rounded bowlder (of diorite usually) and "rub-hammer" or hammer it slantingly ("coaxingly," the Zuñis would say) from the center outward, thence from the peripheries inward but always by oblique strokes tending outward. Now I find that a piece of copper or other soft metal thus treated, rapidly spreads, behaving somewhat as the rawhide does. When a maul with a slight, but very firm grain is used (a maul of compact granite or quartzite, for instance), the rough face aids the thinning and spreading of the metal (until very thin) by displacing the surface molecules at a multitude of minute points, thus pitting the face of the metal and keeping it from becoming harder and more brittle than the mass or medial portion; thereby also the metal is toughened (since the blows fall always in different places), is not so rapidly hardened throughout, and is actually not so liable to scale or crack as when treated with a smooth-faced hammer of iron or steel. As soon as, in my experiments, I have in this manner reduced a plate almost to the desired thinness, I have with a smoother stone (like the back or butt of a worn-out, well-polished diorite celt) supplied with a flexible handle, gone over both sides of it to reduce all the larger irregularities and to partially smooth the surface where pitted by the coarser maul. This may be done partly by hammering, partly by combined rubbing, pressure and rolling with a smooth, unmounted bowlder. I have then proceeded precisely as an Indian would in dressing down the flesh side of his hammered sheet of parfleche. I have taken flat-faced pieces of fine sandstone and, laying the sheet of metal on a firm, level

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spot, with a buckskin underneath to act as a buffer and also to help hold the plate in place, have ground, then scoured, first one face, then the other, until uniformity of surface and of thickness have been secured.

It happened that in some of these experiments places which had been accidentally grooved or indented in the sheet by the corner of my rubbing stone, or otherwise, when it was turned over and carelessly ground on the other side, were worn or cut through. This taught me what I had before suspected, both from the study of skin-working and from very natural inference, that the sheet-metal, even when thicker than that of which the ancient specimens usually found in the mounds were fashioned, could be cut into any form or perforated in well-nigh limitless variety of pattern by pressure-grooving, repoussé, or line-embossing from one side or surface, and by grinding across the resultantly raised lines of the other side or opposite surface; and in this further development of the experiments I as constantly resorted to methods in vogue among Indians to-day for embossing skin, etc.



Fig. 3.—Ancient sheet-copper eagle figure from an Illinois mound.

For instance, in one of my experimental efforts to reproduce the celebrated sheet-copper figure of an eagle (Fig. 3) found many years ago by Major Powell in a mound near Peoria, Illinois, I first prepared my plate of metal as above related and softened it by heating to redness for several minutes on a brisk ember fire. When cooled I lightly traced the outline of the figure on one face of the metal plate, and placed the latter, with tracing uppermost, on a yielding mat of buckskin, folded and laid on a level, hard spot of ground. Then I took a long, pointed tool of buckhorn and, adjusting the butt of it against my chest and the point to the design, pressed downward with as much of my weight as was needful to make it sink slightly into the metal

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(Fig. 4), and, continuing the pressure evenly,went over all of the longer lines of the tracing with it. Moderately deep and remarkably sharp smooth grooves were thus plowed or impressed in the ductile metal wherever the horn point had traversed it, except along upward curves and around sharp turns or where hard places happened to occur in the plate. In order to deepen the grooving at such points as these, I found that it was only necessary to use a rounded chisel made from the humerus of a

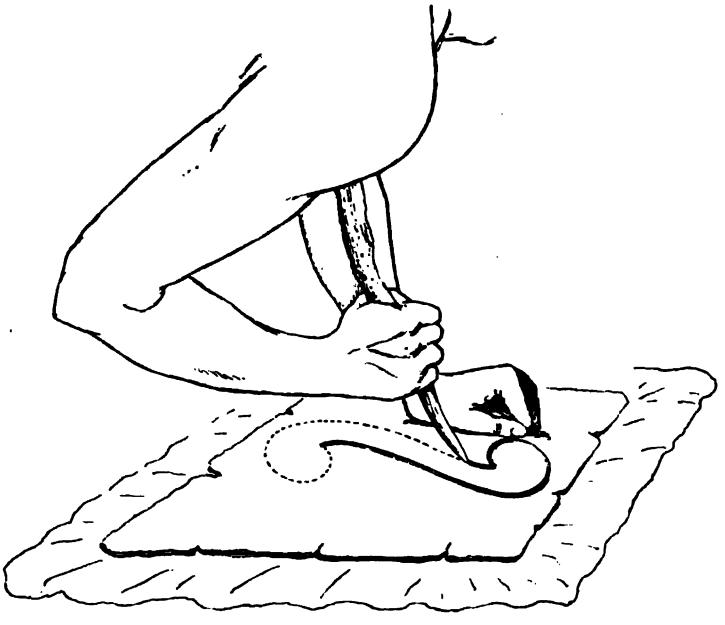


FIG. 4.—Method of grooving copper plate with horn embossing tool preparatory to severing.

deer, like an Indian skin-flesher of bone. This, firmly grasped and pressed by the hand alone, then rolled or rocked to and fro, served admirably to deepen straight grooves to any extent desirable, or, if twirled while it was being pressed down and rocked, to impress or deepen curved lines (Fig. 5).

When all the lines of the design had been completed by these combined processes of pressure-drawing with the horn tool and pressure-rocking with the bone tool, the plate, on being turned

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over, exhibited in clearly raised outline the reverse of the pattern I had traced and thus embossed. On grinding these sharp ridges crosswise with a flat piece of sandstone (Fig. 7, A) their apices were speedily (within seventeen minutes) cut through, and the eagle form as outlined by the embossing (Fig. 8) was thus completely severed from the plate, leaving the portion from which it had been removed like the open space of a stencil.

In subsequent experiments I discovered many additional processes, and developed improvements on the earlier ways of working. Perhaps the most significant of these latter was the employment of part-patterns (cut out of firm, yet slightly flexible rawhide by identical methods) as guides for figures of bisymmetrical outline, such as are so often found in the mounds. By firmly holding one of these half-patterns flat against the plate to be embossed for cutting out, then running the horn point around it to strike-in one side of the design, reversing the pattern and continuing the embossing operation for the other side, an outline at once intricate, and of course bilaterally symmetrical, could be almost as rapidly struck-in as could be the simplest device. Such outline could also be repeated any desired number of times.

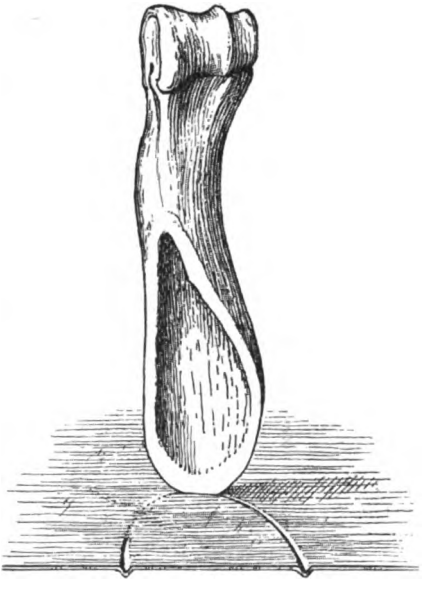


FIG. 5.—Method of grooving copper plate by pressure and rocking motion with bone chisel.

Singularly enough, the edges of patterns cut out by embossing from one side and grinding off on the other require but little finishing. The marginal lines are very clean and not much thinned. This may be explained by the accompanying sections of an embossed plate.

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The groove being made sufficiently deep (Fig. 6, A), the upper surface of the metal is depressed to or beyond the opposite surface (Fig. 6, B, *a a*), so that the groove itself is bounded by walls, the axes of which are at an obtuse angle to the plane of the plate. Thus, when the plate is reversed and the apex of the groove is ground off (Fig. 7, C), these walls are in turn cut off nearly at right angles to their vertical plane, and are therefore blunt and slightly beveled, not thinned to a knife-edge, as might be expected. On being hammered down (Fig. 7, D, *a a*) these edges appear as they would if cut almost vertically by a powerful graver or shear.

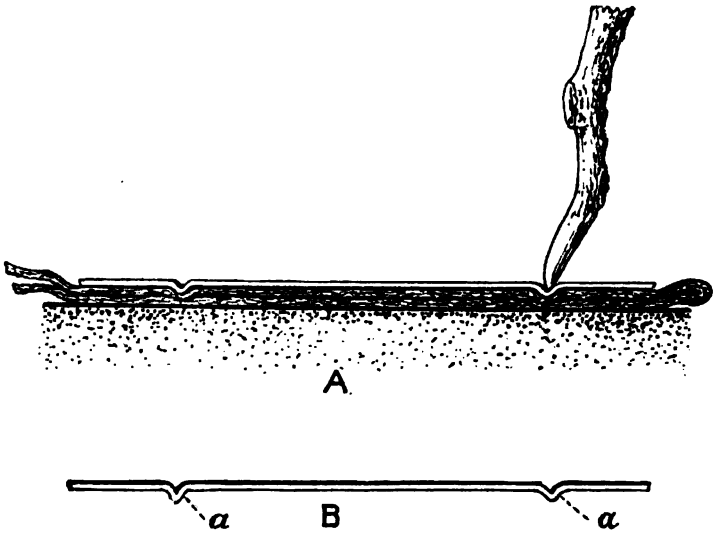


FIG. 6.—Sections showing method of line embossing (A), and depth of groove necessary for severing by grinding (B).

Before my visit to the Columbian Exposition it had been impossible for me to examine originals for traces of processes kindred to those I had employed. An inspection of Mr. Moorehead's specimens exhibited there, and, subsequently, of those comprising the collection now in the Bureau of American Ethnology, convinced me that they had been worked by methods probably similar to, if not identical with, mine. First, the plates of which these figures were made had been smoothed by scouring; second, the cut edges of figures or open-work patterns were slightly

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beveled, except at points where they had been more or less dressed down by crosswise grinding with gritty stone; third, the edges of small open spaces, such as holes (other than drilled ones) less than an eighth of an inch in diameter (too small for the introduction of pointed grinding stones), had not been dressed from the inside, as they might have been had the artificers of the specimens possessed slender files, but had been left sharp and raised, and showed distinct trace of the horizontal grinding by which, after they had been partially punched or raised, they had been cut through; fourth, after the outlines and open spaces had been cut in the more elaborate of these speci-

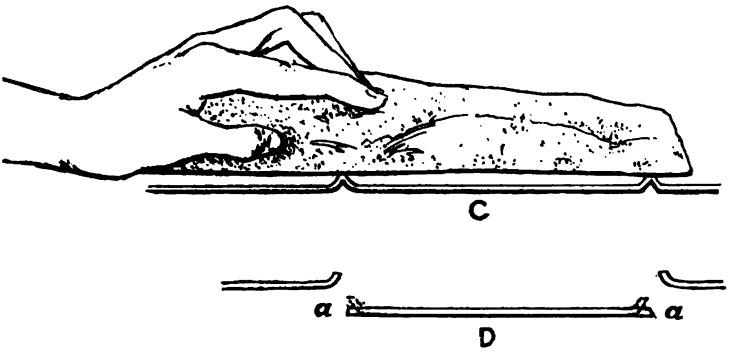


FIG. 7.—Sections showing method of severing figures from copper plates by grinding (C), and of flattening edges of figures after severing (D).

mens, the latter had been again turned over and embossed, mainly by pressure, from the side opposite the one from which they had been impressed for the cutting.

Additional points of technologic significance and interest, developed by my experiments and by comparison of their results with features of workmanship on the ancient specimens under discussion, might be presented. Reserving these, however, for a future paper on primitive metallurgic art in America, I do not hesitate to say, in summing up this portion of the present study: first, that I have neither seen nor heard of a single object of copper from the mounds which I cannot reproduce from native or nodular copper with only primitive appliances of the kinds described, by successive processes of stone-hammering, beating and rolling, scouring, embossing and grinding—such processes as, in more or less modified ways, are actually employed to-day

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by comparatively rude Indians in the fashioning and embossing of parfleche, horn, and other like substances: second, that sufficient results of these experimental studies have been above brought forward, I trust, to establish as an easy possibility, if not probability, the aboriginal and prehistoric character of the workmanship on the sheet-copper articles from the Ohio and more southern mounds.



FIG. 8.—Hammered plate of copper showing line-embossed figure of eagle prepared for cutting out by grinding.

This evidence may be reënforced, I think, by a few additional brief considerations relative to especially the symbolic art displayed in these specimens, and to its relation to mound art as shown in other materials.

Professor Holmes, than whom no higher authority could be quoted on this subject, has stated that "if in the end it should turn out that these remarkable [copper] objects are the unaided

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work of the mound-builders, we shall be compelled to recognize their standing in the manipulation of metal, and in the art of design generally, as unsurpassed by any other native American people."

Probably no one influence so greatly affected this high development of the mound-builders in copper-working as the occurrence in the Lake Superior region of almost limitless, easily accessible supplies of the pure mass metal. There is abundant historic evidence and there is still stronger archeologic evidence of the wide distribution of this copper among native tribes at the time of the discovery, and throughout the entire mound region, at least, in prior times. The only known deposits of native copper other than those of Lake Superior that contain occasional masses of free malleable silver are, I am told, those of the Ural mountains, in Asiatic Russia, and these were discovered and worked only in comparatively recent times. If this be true, articles of beaten copper containing patches of this pure silver, like those found by a friend of mine a few years since in Florida, afford indisputable evidence of the distance to which copper from the Lake Superior quarry mines was transported; and as in nearly all other sections of the mound area these bits of native silver have been found thus mingled with or purposely separated from copper fragments and objects, the conclusion is equally warranted as to the same source of derivation. But most significant in this connection is the fact that, previously to the present century, only one effort was ever made, so far as is known, by other than Indian stone-age peoples, to quarry or mine the Lake Superior copper. This was undertaken by the Jesuit fathers, who so signally failed that they abandoned the attempt almost immediately.

From this and from the fact that traces of vast quarrying operations on the shores of Lake Superior attest to the activity there of aboriginal miners for a very long period, we may venture to assume that this Lake Superior copper was known to the mound-builders for such length of time, and was procurable to such extent that, being workable in the natural or raw state, it inhibited their discovery of the value of smelting and casting, and correspondingly stimulated their knowledge of and proficiency in its treatment by hammering, pressure, etc.

Another influence, scarcely less potent, must have helped to develop their skill. Among all tribes of America who, when

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first known or subsequently, possessed a practical knowledge of metal-working, the beginning of true artisanship was developed; that is, a distinct class of special workers existed or speedily came into existence, as among the Northwest Coast tribes, the Zuñis and the Navajos—a more distinct class than the especially skilled arrow-makers and shell-workers of more primitive conditions. This, we may believe, was the case with the mound-builders, and that the result of it was, as with the modern tribes mentioned, the development of the highest possible deftness in the use of means and materials available.

Among the mound-builders this art in metal must have been influenced primarily, both technically and otherwise, by their earlier arts in stone, bone, horn, and shell, and must have reacted later on these arts; hence remains of their finer products in all of these diverse materials exhibit striking unity of design and similarity of conventional treatment. This is especially true of their larger ornaments and amulets in shell as compared with their badges and decorations in sheet-copper, for both materials were precious and probably sacred, and both, if I may judge by further experiments, were to some extent manipulated in similar ways. Horn or wooden tools, like those employed in embossing copper, had but to be tipped with gravers of flint or other hard substances, or used in connection with sand or other grinding materials, to serve for engraving shells or cutting out sheets of mica, etc., quite as well as for working copper without these accessories.



Fig. 9.—Shell gorget, engraved with representation of contending Man-Eagles.

It is not surprising, then, that in copper, shell, and, to a less extent, in mica, the same figures are often found represented in almost identical lines and outlines, as illustrated by Figs. 3, 9,

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10, and 11, reproduced by kind permission from the earlier reports of the Bureau of Ethnology.

One of the most striking features in designs of like character common to both shell gorgets and copper decorations, is their frequent bilateral symmetry, as may be seen by comparing out-

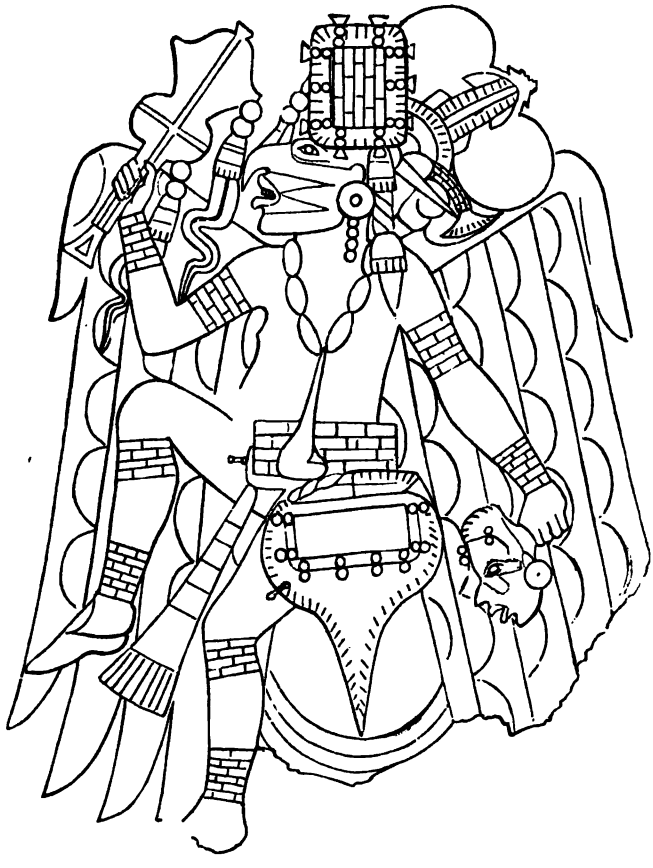


FIG. 10.—Embossed copper plate representing Man-Eagle of War.

lines of wings, etc., in Figs. 3, 9, and 10. I have explained this in the case of the copper objects as probably resulting from the employment of thin half-patterns as guides for the points of tools used in embossing (see page 103); and it seems not impossible

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that part patterns of a similar nature may have been used, first on one side, then on the other, as guides for the graving and grinding tools used in carving such shell figures as the one from Tennessee shown in Fig. 9.

Another feature common to all winged figures, whether represented in copper or on shell, is the peculiar decoration of the feathers with series of semicircular indentations or cuttings along their inner edges, as shown in Figs. 9 and 11 (shell), 3 and 10 (copper).

It may be seen that some of these semilunar feather markings in the design of one of the shell specimens from Georgia (Fig. 11) are cut entirely through. This kind of open-work in engraved and carved shells is common, such semilunar incisions or perforations being particularly frequent, perhaps because of the facility with which they could be incised by working a graver back and forth inside of or around a semicircular guide, or could be perforated by drilling one large and two smaller holes close together.

There can be little doubt that the mound-builders thoroughly understood this art of engraving shell long before they had acquired a practical knowledge of copper. There can be as little doubt that when they first began to work in copper the supply of this metal was very limited. Thus their ingenuity was taxed and their abilities quickened to make as much as possible of the little copper they had, by beating and otherwise drawing it out into very thin sheets or leaves. In doing this they could not have failed to observe that as soon as thinned, the copper took the impression of anything it was being worked over, precisely as would moistened hide or softened and flattened horn. This, then, I imagine to have been their beginning in the repoussé treatment of copper. At first, we may suppose they rolled sheets of the metal around their long bone and shell beads, which in time led to the making of the long cylindrical copper beads so common in the mounds. With such sheets they also covered their double ear-beads of shell, then spool-shaped ear-buttons of horn, until finally they also made the copper ear-buttons, likewise so common in the mounds, of the metal alone. Thus, too, they coated their shell gorgets or the figure-designs on them, pressing the thin metal into the lines and spaces of these designs with tools of horn and bone. If one

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of these shell figures, in which the semilunar marks on the wing feathers had been simply incised, were thus coated with thin, soft copper, it will be seen that these marks would show in the metal as semilunar grooves. If a shell figure in which the feather marks had been represented by perforations were thus coated, then the sheet-metal would sink abruptly a short way into these open spaces and show as clear-cut half-round indentations, as though punched in with a flat-faced die.

It is a fact that on all winged figures in sheet-copper thus far found, the semilunar wing-marks invariably present one or the other of these forms of indentation, either grooved outlines corresponding, as it were, to incisions on shells, or else flat depressions representing, so to say, perforations in shells.



FIG. 11.—Shell gorget engraved and carved to represent Man-Eagle of War.

It is probable, then, that this inappropriate, though characteristic and conventional way of representing feather flutings in the wings of copper figures, so natural when worked in shell, originated in the copying of such copper sheathings when severed from shells having similarly shaped incisions or perforations. The origin of yet other characteristics of the copper figures not easily accounted for otherwise may thus be readily enough explained.

The inference is that, as to design, the copper art of the mound-builders was to a great extent derived directly from their shell

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art, and therefore that it was as probably indigenous. This inference is strengthened by an analysis of certain symbolic tokens, or signs of special mythic concepts, to be seen in the figures as portrayed on both copper and shell.

By examining Figs. 3, 9, 10, and 11, it may be seen that they all represent *one thing*, the Eagle God, either in his simple or animal form, but with the mark of "doom" or "war" on his face (Fig. 3), or else as the Giant "Man-Eagle of War" (Figs. 9, 10, and 11). In all of these figures of the Eagle War God, whether as Eagle Man (Fig. 3, Illinois) or as Man-Eagle (Fig. 10, Georgia), the "strong feather," or "thumbnail plume"—which "cuts the breaths" of the fiercest demons or "cleaves the strongest storm-wind"—this plume is as prominently represented at the shoulders or outer bends of the wings as it is over the wings of the comparatively modern shield-painting of the Zuñi sky god *A'-tchi-a-la'-to-pa* or the "flint-winged" Man-Eagle of War and the Thunderbolt. (Fig. 13) This, then, is a distinctive Indian characteristic, since it may be observed in the paintings or other delineations of eagles (but not of other birds), made also by members of several other Indian tribes; hence it serves to identify the composite human-eagle figures in the mound-builder specimens with the simpler eagle figure of the same series. In the latter also (Fig. 3) is an equally characteristic representation, that of the "umbilical" or "anal mark" (or sign of the "power of the bowels," as it would be called by the Zuñis). By this the figure was made not merely an effigy of the eagle, but also an amulet or fetich of him as being a god, for it was supposed (for obvious reasons) that his figure was thereby endowed with the power of



Fig. 12.—Shell engraving probably representing God of the Two Winds.

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continuing the life it gained from the food of sacrifice and slain enemies.*

In the semi-anthropomorphic man-eagle figures, however, this mark is invariably replaced by the loin-cloth, the equivalent human symbol of virility or manhood, as in Figs. 9, 10, 11, and 12. This also accords with the ideas and usage of the present Zuñi and other Indian tribes.

But perhaps the most pronounced, certainly the most conclusive evidence of the mythic and sacred character of these man-eagle figures is found in the fact that each is represented with a mask, the symbol of "transformation," held in the hand (Figs. 10 and 11), to symbolize the *act of* transformation from eagle form into human form or *vice versa*, the mystic power of which these gods were regarded as possessing.

In further proof that this was the meaning intended by the portrayal of these masks in the figures, reference may be made to the simpler eagle form (Fig. 3). Although his cheek is painted with the zigzag "swift line of tears," denoting the sudden doom he as a god of war is able to cause, and although the line of "detachment" crosses his neck to signify his power to change, yet he bears no mask, being as yet *untransformed*; nor are the contending man-eagles (Fig. 9) shown as carrying masks in their hands, but would be found represented as wearing them were we able to see their faces (unfortunately destroyed). since they were depicted *as already transformed* for mortal conflict.†

*Thus Zuñi effigies of the animal gods—the fetiches of war and the chase—are supplied with this mark or with the symbol of the heart, or with both, to make them potent or open for them their "passage-way of life." The ornamental bands encircling the tops and bases of their food and water vessels are also left slightly open or spaced, on account of a similar animistic conception of them.

† I would call attention to the fact that these interpretations, while due to the exercise of "imagination," are not fanciful. They represent real Indian concepts, well known to me through having myself been required to perform, according to elaborate ritual and formulæ, the ceremonial of transformation (or exchange of my spirit person) and other like symbolic acts founded upon identical concepts; for it is held by these and other advanced Indians that the dancer in the sacred dramas, after having his face properly painted (see Figs. 10, 11, 12, and 13), can change or transform his personality by simply putting on or taking off his mask, usually with the left or non-combative hand, as in these.

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The bearing of these observations on the question as to whether or not the copper and shell arts of the mound-builders, both in design and workmanship, were indigenous, is important. They show conclusively, I think, that both arts were Indian, and that both were North American Indian.

Thus, some of the copper works may be as ancient as the fondest romanticist could wish, or on the contrary (and some of them probably are), as modern as the days of De Soto; but, whether ancient or recent, they are of Indian origin and neither Oriental, as some have claimed, nor European, as others have naturally been led to infer by the very high degree of workmanship they exhibit and by certain supposedly analogous art traits. I think it has been shown by the foregoing "experimental study" that the beauty and finish of the finest of these specimens might readily have been produced by the mound-builders. I also believe that the designs themselves have been accounted for as pertaining equally to a native, very old, as well as to a more recent indigenous technical art, and as being specifically Indian in respect to both mythic motive and the conventional or artistic expression thereof.

The only figure in the series which seemingly exhibits marked European traits is that of the eagle; but this also exhibits, as I have shown, very significant characteristics of North American Indian art, and, as indicated by the scallops of the wing feathers, belongs to the very old native family of Man-Eagles. The bilateral symmetry of this specimen, so suggestive of the heraldic "eagle displayed" (*l'aigle éployé*), is explained as a technologic feature, the result of pattern tracing; while the "regard" of the bird, the turn of his beak *toward the left*, is decidedly unheraldic; for all charges, on or off of European armorial shields, must "regard the dexter side." Finally, the treatment of the legs and claws of this and other copper eagles also appears heraldic; but while unusual as an Indian mode of treatment in *painted* figures, it is nevertheless Indian; for example, the Zuñis, the ancient Saladeños and the modern Haidas, managed the legs and claws of eagle and composite eagle figures made "in the flat" (or cut out of hide, thin wood or slate) in almost precisely the same manner.*

*Several questions arise in this connection, among them being: 1. If the hammered or sheet copper articles found almost universally in

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There is one characteristic of the composite human-eagle figures which raises the latter, artistically, but not conceptionally, above anything else of the kind in native American art. The Man-eagles are provided with arms as well as wings, as were those of Assyria, Egypt, and Europe; but this does not prove the designs of them to have been either Oriental or European in origin. It simply demonstrates the artistic capacity of those who fashioned them. The conception was a well-established Indian idea.*

the mounds were of European origin, why is it that *cast*-copper objects, being cheaper, more readily made and duplicated by European artisans, and more suitable for certain purposes than if made in the flimsy sheet-copper form, are never, so far as I know, found in the mounds—even heavier work, celts, etc., being hammered, not cast? 2. Was there an artisan of the sixteenth or seventeenth century who could or would have grasped so thoroughly the special Indian spirit of art as displayed in these composite specimens? I find that I cannot reproduce them faithfully unless I recognize just what they expressed, and at least *finish* them with primitive tools. I can copy them otherwise, but my copies are easily distinguishable by marks that only the greatest care can eliminate. 3. The mound-builders had already waned when De Soto reached the Mississippi. He and others saw descendants of them who were still building mounds, it is true, but they were comparatively few. Hence we can expect to find only in comparatively few of the typical mounds any trace of European art, whereas these shell and copper figures are found far and wide. I am here, be it understood, considering evidence as to the date and character of these works in copper and shell rather than as to the date of the decadence of the typical mound-builders, which latter event, I believe, may not necessarily have taken place very long prior to the discovery.

*For example, Zuñis have certainly not borrowed their idea of the Whirlwind God; yet they clearly conceive of him as a being who wears the face of an eagle, has the body, arms, hands, and legs of a man, the claw-feet, wings, and tail of a vulture, the feathers of which are filled with "flint sand." Yet when a native artist paints this composite monster, he gives him wings and tail, but no arms and hands (as in Fig. 13). He will tell you that the God, when flying (in which characteristic act he is always depicted), "has to use his hands and arms to help flap his wings withal;" but the plain fact of it is that the Zuñi is not so good an artist as was the mound-builder. One of their best decorators once attempted to draw for my edification an angel like the cherubim belonging to the old Franciscan church of his pueblo. He strove hard to separate the arms from the wings (as he remembered having seen them separated in the statue), but ended by depicting them *laid along the tops* of the outspread wings.

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The presence of certain ornate designs in the Moorehead collection, which seem at first "too good" to be Indian, are in form neither different from nor better than excised plates of mica of undoubted antiquity from the mines of the Carolinas. The presence in the same collection of certain seemingly Oriental symbolic figures may be explained as perfectly natural indigenous growths. Such is the decorated Swastica cross, which, in cruder form among the Havasupais, Pimas, ancient Pueblos, and Mexicans, simply symbolized the four winds and directions in one as the "all-wind" sign. It was derived from the earlier symbol of the cross of the four directions, inclosed by a circle or square, which in turn symbolized the horizon, or the four horizons. When this was made open at the four corners "to let the winds in" it became the Swastica or *world*-wind symbol.



FIG. 13.—Zuñi shield painted with representation of the flint-plumed God of War and the Thunderbolt.

The art displayed in these mound-builder specimens certainly resembles that of Mexico and Central America. This resemblance is not detailed and may be adventitious,* or it may, to a slight extent, indicate

* An illustration of this may be seen in the engraving on a shell gorget from Missouri (Fig. 12), which represents, apparently, a God of the Winds—perhaps of the Two Winds, or good and evil breath—and is more or less like a Mexican figure; but this resemblance is merely superficial. As would be the case in a Zuñi representation of the Dawn-God blowing the wind of the morning dew through a flute with a flaring gourd-shell mouth, so this personage is shown as if blowing through a somewhat similar instrument. In the mouth of his mask, or "double," is seen another of these, on the tube of which is cut the zigzag line of swiftness; while in his hand he carries as a baton or perhaps a thunder-mace, what appears to be a third, with the stem marked diagonally, or twisted to represent force or violence. If this were a Mexican or Central American figure the wind

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derivation from one or the other of these countries by the mound-builders themselves. There is no inherent improbability in this. Mayas and other Central American peoples were waning when Hernandez de Cordova first penetrated their territory, as the mound-builders were waning when De Soto crossed the Mississippi; yet in Central America, in the sixteenth century, city-builders still lived, as descendants of the mound-building peoples were still building mounds in the time of De Soto; and these latter were noteworthy voyagers in canoes, had some silver, more pearls, and abundant copper. Being such expert navigators in canoes, the enormous size of which astonished the Spanish adventurers and was known even to the far-away Pueblos, could they not well have visited southern peoples and given to them, quite as likely as taken from them, art forms?

The art of the mound-builders is in many details quite as like that of the northwest coast as it is like that of the south. In other points the similarity is greater, that is, more general, as the clay trenchers (which are obvious survivals of wooden trenchers extremely like those of the northwest coast) and numerous incised bone tubes will bear witness. How is this to be explained? By the theory of independent development, which is probable, or by a theory of common derivation or descent—alike of some of the Mexican peoples and of some of the mound-builder peoples—which is only possible? Yet there are considerations of import in answer to this question, but they belong even less to an experimental study of primitive copper-working than does the latter or analytic half of this paper.

would be shown by comma-, flame-, or cloud-shaped marks issuing from the mouth of the individual. Again, unlike the Mexican and Central American figures, but typical of other delineations of the mound-builders (Fig. 10), this character wears at his hip a pouch, decked with bosses and plates of copper. All of his other accouterments, too,—copper ear-buttons, the copper crest or comb over his mask, etc.,—are crude, but characteristic representations of articles found buried and similarly associated with the dead, in mounds from Ohio to the Gulf, articles as distinctive of the mound-builder Indians as the elaborate plume-dresses, obsidian-spiked war-clubs, and the throwing-sticks of Mexican figures are of the Aztecs. On the whole, this art of the mound-builders seems sufficiently self-centered to stand by itself as well as better-known arts of other ethnic areas of the continent.

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BOOK NOTICES.

Legends of the Micmacs. By the Rev. Silas Tertius Rand, D. D., D.C.L., LL.D. Wellesley Philological Publications. New York and London: Longmans, Green & Co. [Boston, N. Wilson & Co.], 1894, 8°, xlvi, 452 pp.

The compiler of this collection is the late Dr. Rand, for forty years a missionary among the Micmac Indians of Nova Scotia, and author of a dictionary of the language and of numerous other works relating to that tribe. The Micmacs are the eastern-most tribe of the Algonquian stock, and although still retaining most of their primitive habits, their mental life has been strongly influenced by three centuries of contact with French Catholic priests and fishermen, a fact which becomes apparent as soon as we examine the legends.

As a contribution to aboriginal mythology the book is a grievous disappointment. As a warning to ethnologists it is an unqualified success. It might seem, at first thought, that a scholarly man who had lived in intimate acquaintance with a tribe of Indians until he spoke the language almost as his mother tongue might be able, when he set about it, to give us such an account of their myths and traditions as would possess some scientific value. The book shows, however, an utter inability to discriminate between the true and the false, and a complete ignorance of the aboriginal range of thought, with the result that we find the Arabian Nights and Grimm's Fairy Tales given as Micmac legends. The same mistake was made by Father Petitot, who publishes the story of "Brother Lustig" as one of a volume of Indian tales, although it contains not a single aboriginal idea. Like other children, Indians are fond of stories, and readily learn and repeat anything in that line that strikes their fancy. They have been learning fairy stories from French voyageurs and Highland trappers for at least two centuries, and have had descriptions of heaven and hell, of angels and devils, for as long a period. There is probably today not a tribe on the continent that has not assimilated some of this material, but when we compare this collection by the Rev. Rand with the Pawnee and Blackfoot tales of such an investigator as Dr. Grin-

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nell the difference between the genuine and the borrowed is at once evident.

The author himself, in his introduction, unconsciously shows us how these "white man stories" come among the Indians and how direct is the line of descent. His first instructor in the language was a Frenchman "who had lived among the Indians nearly all his life and could talk both French and Micmac very fluently." This man's father had been a French sailor who had drifted to Nova Scotia. "The son lived among the Micmacs, married one of them, and translated his name, Joseph Ruisseaux, into Joseph Brooks. He rendered me great service in mastering the Micmac language, and it was from his lips that I first learned of the wonderful legends that, after confirmation by many old Indians, I subsequently gave to the world."

Then he goes on to tell us genuine Indian stories of Glooscap, of Kitpooseagunow, and other aboriginal gods and heroes, stories which are full of interest and value to the ethnologist, but which are so mixed up with such tales as "The Prince and the Peasant Girl" and "The King's Daughter and the Man Servant" that it is hardly worth while to try to separate Micmac from missionary. Several times, indeed, he seems to have his doubts, but his final verdict is always for the stories. For instance, he gives us "The Prince and the Peasant Girl," which begins:

"There was once a king who had two sons and one daughter. He lived in a large town and had many fine horses, many servants, and seven donkeys. He was in the habit of driving out in his carriage and taking his queen and three children with him; but when he did so he took, instead of horses, the seven donkeys to draw the carriage." Of this he says: "While it relates to the white people, it bears unmistakable marks of Indian authorship. First, the king is supposed to have a neighbor king, so near that his son could go and bring his bride home in one day; second, the king's business is supposed to be to look after the poor and to see that they are well supplied with seed potatoes; third, it does not seem to have occurred to the author of the story that the poor peasant girl's education and previous training would be likely to appear occasionally and reveal her humble birth. All this is as natural as possible, as exhibiting the consciousness of the untutored Indian." (!)

The story of "The Magical Food, Belt, and Flute" starts out: "There was once a king who owned a large farm in the neigh-

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borhood of the town where he resided; the farm was cultivated by a man who paid rent for it to the king." The man dies, the rent comes due, with no money to pay it, so the widow "concludes to select one of the finest cows and sends the boy off to market to sell it." He admits that this story "has a tinge of modernism about it," but because the stupid boy turns out to be a hero he concludes that there is "an unmistakable Indian stamp to the story. Their legends delight in making tiny, insignificant things perform great wonders." Is it possible he never heard of Tom Thumb?

The book contains many good things and is interesting throughout, but is of little scientific value except to the ethnologist already sufficiently familiar with the subject to be able to sift the material.

JAMES MOONEY.

The Land of Poco Tiempo. By Charles F. Lummis. New York: Charles Scribner's Sons, 1893, 8°, xii, 310 pp., 38 ill. $2.50.

Any one who has visited the extreme Southwest will at once identify with it the name of this new book—the "Land of Pretty Soon;" or, as Mr. Lummis also aptly terms it, "The National Rip Van Winkle—the United States which is *not* United States." The writings of Mr. Lummis are doing a great good by affording the general student of the history and ethnology of the Southwest a more correct solution of this "Great American Mystery" than he could otherwise gain, divorced from the many popular fallacies with which most of the literature on this region is so replete. Fortunately for the author, in his scientific work he has been under the tutelage of Bandelier, to whom he alludes as the founder of the new school of American archeology, "for science is but little the richer for the peckings of others at this field."

The Land of Poco Tiempo is well described. "'Lo' who is not poor" is the title of a chapter devoted to the Pueblo Indians, "the most striking ethnologic figure in our America to-day. . . . He is the one racial man who enjoys two religions, irreconcilable yet reconciled; two currencies, millenniums apart in the world's ripening; two sets of tools as far asunder as the Stone Age from the locomotive; two sets of laws, one coeval with Confucius and the other with the Supreme Court;

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two languages that preceded us, and two names, whereof the one we hear was ratified by the sacrament of Christian baptism. while the other, whereby he goes among his own, was sealed upon his infant lips with the spittle of a swart godfather at a pagan feast." Poverty, he argues, is quite unknown to the Pueblos, for these villagers own silver, coral, and turquois ornaments alone to the value of $100,000.

In "The City in the Sky" he describes Acoma, probably the only pueblo of New Mexico standing on the site it occupied when the Spaniards first found their way into New Mexico. In a chapter on the "Penitent Brothers" he tells of the New Mexican offspring of an old Spanish Franciscan order whose members resort to self-flagellation and even crucifixion for penance, and although both church and state have endeavored to abolish this survival of the order, they still maintain their fanatic practices. Some of the performances of the Penitentes have been witnessed and photographed by Mr. Lummis.

"The Chase of the Chongo" describes the ceremonial game of the kicked stick; the "Wanderings of Cochití" relates in a thoroughly interesting way the successive shiftings of the Queres inhabitants of Cochití before Coronado came in the middle of the sixteenth century.

The Southwestern nomad is allotted two chapters: "The Apache Warrior" and "On the Trail of the Renegades." None of the papers will prove of greater interest to the folk-lorist than the chapter on New Mexican folk-songs.

Each Pueblo has its patron saint in the Catholic church, to whose honor the appropriate day of the calendar is set apart for the performance of ceremonies "contrived to do homage to the *santo* and to all the pagan Trues at one fell swoop." Chapter X, "A Day with the Saints," describes their ceremonies as witnessed by the author at various pueblos. The concluding article, "The Cities That Were Forgotten," is probably still fresh in the minds of many of the readers of *Scribner's*, and we are pleased to see it here in more permanent form. In this chapter the myth of the "Gran Quivira," which Bandelier has so completely exploded, is carefully and accurately related.

Altogether the volume, from the popular point of view, is the best that has yet been published on our Southwest. It is beautifully printed, and its numerous excellent illustrations are from photographs by the author. F. W. Hodge.

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The Native Calendar of Central America and Mexico. By Dr. Daniel G. Brinton. Philadelphia, 1893, pp. 59, 8vo.

As Dr. Brinton announced to the public, in his introduction to the "Annals of the Cakchiquels," that he "proposed in a future work to discuss the methods of reckoning time in use in Central America," we presume the work with the above title, which has just appeared, is the fulfillment of that promise.

Dr. Brinton is better equipped with material for this investigation than any other person, and his work was received with the hope that we should find therein the solution of some of the troublesome problems relating to this Calendar. Although, like all his works, the book contains much that is valuable and interesting, a careful examination results almost in a feeling of disappointment. It is probable that he and Dr. Seler have together made the most that is possible out of the linguistic and historical materials; if so, we are forced to the conclusion that the solution will only be reached when further advance has been made in the interpretation of the hieroglyphic writing, a branch of the subject upon which Dr. Brinton does not enter.

The scope of the work, which is based chiefly on linguistic material, may be indicated by the following headings: "Geographical extension of the Calendar system; Mathematical basis of the Calendar; Where did it originate; Analysis of the day and month names; Symbolism of the day names; and General symbolic significance of the Calendar."

In his explanation of the names of the days he follows substantially the same method of reasoning as that adopted by Dr. Seler in his paper on the same subject, though the conclusion reached in reference to the individual names is not always the same. However, they agree in concluding that the corresponding names of the different calendars were intended to express substantially the same idea; hence that they had a common origin. This conclusion appears to be justified as to a majority of the names; but the relation in some cases is made out by apparently circuitous interpretations.

It seems rather singular that Dr. Brinton, who is inclined to the belief that the Calendar originated with the "ancient branch of the Mayan stock, who inhabited the present states of Chiapas and Tabasco," should be so largely influenced in his definition

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of the Maya names by the signification of the Zapotec and Nahuatl names. This, however, is probably due to the fact that the signification of the latter is better known than that of the former.

In one or two places where reference is made to Dr. Seler's opinions, they do not appear to be correctly given. Under the "Fifth Day," *Chicchan*, he states that "Dr. Seler says that 'undoubtedly' it means 'a sign marked [mark?] or taken [token?].' To give this sense it would have to be read *chech*." Yet this author in his paper* derives the name from *Can*, "serpent," and *Chi*, *Chii*, "mouth, to bite," thus interpreting the day name by "biting serpent." We may also remark that Henderson (MS. Lexicon) gives *Chicul*, "sign, mark, ceremony, token;" and as a verb, "to mark, show, sign."

Under the "Ninth Day," *Muluc*, he refers to the same author as follows: "The Tzental and Maya *Mulu* and *Muluc* are from the radical *mul*, to heap up, to pile up; which evidently cannot refer to the 'gathering together of waters,' as Dr. Seler suggests, but rather to the heaping up of the clouds in the sky." Dr. Seler does suggest that we may conceive here the idea of a "gathering of waters," but it is evident from what follows that he alludes to the gathering in the heavens, from which the rain descends, which is precisely the same idea as that suggested by Dr. Brinton.

The analysis of the month names is brief, and, so far as it relates to those of the Maya Calendar, is based upon the theory that they refer chiefly to the religious ceremonies and festivals observed at certain seasons. While it is true that they are radically different from those in use among other tribes of this stock, it is doubtful whether the method of their derivation could have been so totally different from that by which the names of the months of other calendars were obtained, as this theory implies. The names of the latter, in regard to which Dr. Brinton furnishes some new and valuable data, appear to refer to certain natural phenomena, agricultural operations, the seasons when certain animals are most plentiful, when certain flowers bloom or fruits ripen, etc. This is precisely what we should expect, and hence hesitate to accept a theory of wide

* Zeitsch. für Ethn., 1888, Heft 2.

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variation in one of the tribes without stronger evidence. From the study of the month symbols found in the Dresden Codex, I am inclined to believe their interpretation will show that the Maya month names have been derived, as a rule, in the same way as those of other tribes.

It is to be regretted that the author has failed to give us the evidence on which he bases his conclusion that the Quiche-Cakchiquel calendar followed the four-year system, having four "year-bearers" as the other calendars. If, as he has shown us in the "Annals," "every year ends on a day, *Ah*," it would seem impossible, if the days followed one another in proper order, that the years could begin with different days; nor will the fact that the closing day was numerically three less than that of the preceding aid in the adjustment.

The closing section of the paper brings clearly before us the goal which the author strives to reach, and leaves the inference that his analyses, as we would naturally expect, have been influenced to some extent by his theory of the scope and object of the calendar system. This theory he briefly summarizes as follows: "That it was intended to cover the career of human life from the time of birth until death at an old age;" in other words, that it is an outlining or symbolic representation of the twenty steps into which Dr. Brinton conceives the natives arranged the single human life. "In the twenty headings under which the agencies which influence human life were arranged, the ancient seers believed," etc., are the words with which he begins his final paragraph.

Our thanks are due to Dr. Brinton for this contribution to the subject of the "Native Calendar" of Mexican and Central American tribes, but we are forced to the conclusion that more material progress in the solution of the problem will not be made until the written characters and time symbols have been deciphered.

NOTE.—I think it possible the calendar may yet be traced to Polynesia. There is strong evidence pointing that way.

CYRUS THOMAS.

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NOTES AND NEWS.

THE LA PLATA MUSEUM EXPEDITION IN THE ANCIENT CALCHAQUI COUNTRY, ARGENTINA.—Few regions in America, where once an indigenous civilization flourished, are less known than that of the Calchaquis, Quilmes, and cognate tribes. Although the Incas once extended their power and influence over this vast country, it cannot be asserted with absolute certainty that Calchaqui culture was only an offshoot of that of Peru. To collect an abundance of material and facts tending to solve the question of alleged affinity between the two cultures was the object which led the Director of the La Plata Museum, Dr. Francisco P. Moreno, to organize an expedition early in 1893. At the same time geographical and geological explorations formed a part of the program. The scientific staff of the expedition consisted of Dr. Moreno, Captain G. Lange, civil engineer, F. Bovio, and R. Hauthal, geologist, and two assistants. I myself, on returning from Polynesia, being appointed curator of the La Plata Museum, had the privilege of joining the expedition. Being more particularly in charge of the archeological section of the expedition, my reconnaissances and excavations extended over a large tract of mountainous country, situated in the provinces of Catamarca, Tucuman, and Salta, from the capital of Catamarca southward to Payogasta northward. Traveling in those regions offers fewer facilities than in the southwest of the United States, and, taking into consideration the few months employed in field-work, the collections made by the expedition were large and important.

Pottery in a great variety of size. form, and ornament is especially abundant in this region, but the stone and bone implements, copper disks, bells, and ornaments, stone fetiches, textile fabrics, and human skulls and skeletons, though less in number, are equally valuable. Several ruins were surveyed and many petrographs copied. All this material, added to that which the Museum already possessed, forms an archeological collection of objects and data quite unique.

As I have had the rare advantage of seeing *in situ* the remains

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of American indigenous culture at its extreme limits—in the southwestern United States and in northwestern Argentina—I was enabled to find several parallels between the Shiwian or Zuñian culture and that of the Calchaquis. I extract from my summary report to the Director the following passages, which may serve to illustrate these parallels:

The civilization of the Calchaquis is essentially what Mr. Frank H. Cushing called very properly a "desert culture." The great similarity of physical conditions of the two countries seems to have caused a similarity in products of human activity, and may have influenced the mythico-religious and sociological institutions.

As among the Shiwians (and in ancient Peru) we find here the septenary system of disposition of towns; most probably ritualistic petrographs on sites which clearly indicate former sacrificial caves; stone fetiches closely resembling those found in the ruins of the Salado and Gila river valleys, Arizona, and the fetiches still in use among the Zuñis; small ornamented slabs of stone, almost identical with the slates in use among the medicine priests of the ancient and present Shiwians. Although the form of Calchaqui pottery is generally different from that of the ancient and modern Shiwians in color and decoration, evidently symbolic or ideographic, there are many analogies.

I have often found funeral vessels of earthenware, containing the remains of children, with round holes at the bottom or on the side, or cracks, which cannot be explained otherwise than by admitting that the Calchaquis practiced the same custom as the Shiwians of "killing" their pottery, for the reasons explained by Mr. Cushing. No evidence of cremation or of pyral mounds, however, was found. Double and multiple burials, on the contrary, are as frequent among the Calchaqui ruins as among those of the ancient Shiwians.

Turquoises and sea-shells seem to have been as highly esteemed by the Calchaquis as by the ancient people of the Southwest. Necklaces of these materials were frequently found in graves. Most of the axes and other stone implements of the two peoples are absolutely identical.

The Calchaquis possessed a wholly indigenous knowledge of metallurgic art, which, however, was much more developed than that of the Shiwians. It is probable, however, that in this re-

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spect the Peruvians taught the Calchaquis their superior art and workmanship.

It is a pity that in the Calchaqui region there exists no living remnant with a knowledge of the rites and lore of the ancient people, as in the Southwest where the Zuñis and other Pueblos survive. There are descendants, it is true, of the ancient Calchaquis and Quilme, but they are all christianized and hispanised, hardly acknowledging to be Indians. The greater part died gallantly in battle against the Spaniards or were captured and transported as slaves.

It is to be hoped that the vast collections of Calchaqui antiquities in the La Plata Museum may find a historian as worthy and able as their importance requires. The La Plata collection could furnish to men like Messrs. Holmes and Cushing material for studies as profound and suggestive as they have already devoted to the antiquities of Chiriqui, Peru, and the Pueblos.

Dr. H. TEN KATE.

ETHNOLOGIC REPORTS FROM HUNGARY is the name of an interesting magazine edited in Budapest by Prof. Dr. Anton Herrmann and Ludwig Katona. The object of this periodical is to diffuse information regarding the racial and ethnic peculiarities of the Magyaric and other nations inhabiting Hungary and such neighboring countries as show ethnic affinities with the Hungarian people: Poles, Russians, and the rest of the Slavs; then Turks, Woguls, Finns, etc. But no people of Europe is excluded from its columns, whenever sketches of ethnographic import are presented. It is written in German, with the title: "Ethnologische Mitteilungen aus Ungarn, zugleich Anzeiger der Gesellschaft für die Völkerkunde Ungarns." It first appeared in quarto size, but has been reduced to the more handy octavo since 1891, four fascicles having been issued since that year. Some of the more important articles are as follows: Albanese people in Slavonia; Right and Wrong; Among Woguls and Ostjaks; Cosmogony of the Woguls; Magyar popular ballads; Spanish colonies in Hungary; Punch and Judy in Turkey; Children's games in Transsylvania; Italian songs from Fiume; On Hungarian Gypsies; Diluvial man in Hungary; The Saxons of Transylvania; A Bosnian Guslar-song: "King Mathias and Peter Gereb."

A. S. GATSCHET.

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BELIEFS CONCERNING RATTLESNAKE BITES.—Many newspaper reports are annually circulated to the effect that there had been discovered a veritable mountain doctor, versed in the mysteries of plants, and celebrated for his wonderful skill in curing rattlesnake bites, but that the remedy employed was preserved with the utmost secresy.

Having consulted with such "mountain doctors" during a period of over twenty years, it has been discovered that they all employ various plants for all the ills that come under their observation, but that few are really acknowledged as having reputed remedies for serpent bites. Nearly all of them place applications of various kinds to the wound, consisting of poultices, etc., some even believing that the warm and bloody surface of a chicken cut in two will extract the poison.

The plant used for this purpose, and the only one claimed by most to possess value, is the *Sanicula marylandica*, or sanicle, termed by the mountaineers "master-root," because it "masters the rattlesnake's bite." The fresh plant is bruised, boiled in milk, and applied to the wound, while a decoction is made with milk to be taken internally. Violent diaphoresis ensues, which may in reality have some effect toward expelling the secretions. I believe this to be the first time this matter has been openly mentioned, and a chemical and therapeutical examination of the plant might result in some practical good to the public.

W. J. HOFFMAN, M. D.

A POSSIBLE CONSTANT OF THE HUMAN FRAME.—Once when making a design for a hand odometer, which is used for measuring distances in topographical surveying and which resembles a wheel-barrow, I measured the distance from the center of the closed hand to the floor of quite a number of men when standing erect and in height varying from 4.2 to 6.3 feet. I found this distance practically the same for each. Therefore I arranged that the handles should be at a convenient height to grasp, and which was 2.5 feet. I can but presume that this fact has been noted and many such measurements taken.

GILBERT THOMPSON.

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THE
AMERICAN ANTHROPOLOGIST

VOL. VII. WASHINGTON, D. C., APRIL, 1894. No. 2.

TECHNOGEOGRAPHY, OR THE RELATION OF THE EARTH TO THE INDUSTRIES OF MANKIND.*

BY OTIS TUFTON MASON.

Definition of the Earth in this Connection.

By technogeography is meant the study of the relationship between the earth and human arts and inventions.

Anthropogeography is the consideration of the earth in its broad connections with the whole science of man, including his body and his mind, his arts, languages, social structures, philosophies and religions. Of this broader subject there are many subdivisions; but at this time your attention will be directed to the activities of men as effected and affected by the earth, to which study the term technogeography is applied.† The arts of mankind have changed the face of nature, and some charming books have been written upon the subject of the earth as modified by human action.‡

*Annual address of the President of the Anthropological Society of Washington, delivered January 30, 1894.

† *Ethnogeography* would be the science of the relations of the earth and its forces to the creation of the several races or kindreds of mankind; *Glossogeography*, of the languages of mankind as effected or affected by the earth; *Mythogeography*, of the relation of the earth to mythology; *Esthogeography*, of the fine arts as born and nurtured by nature, and so on.

‡ George P. Marsh: Man and Nature, N. Y., 1864, Scribner. Arnold Guyot: The Earth and Man, Bost., 1865, Gould. But the father of this science is Karl Ritter, in Die Erdkunde im Verhältnisse zur Natur und Geschichte des Menschen, Berl., 1822–'59, 10 vols.

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But now we are to trace out a few of the great industries of our race as they were provoked and developed by their terrestrial environment; in short, human actions as they were shaped and modified by the earth.

In this inquiry the earth as modifying human life includes the land surface down to the bottom of the deepest possible mine or artesian well or geological stratum; all the aqueous mass—that is, every drop of water in the seas and out of them, for there is no telling when any drop may enter the circle of human agencies and ownerships; the circumambient air, every gallon of that aërial ocean which swathes the world and vitalizes all living things, the common carrier of clouds and birds, of health and disease, of music and perfumes, of industry and commerce. As modifying human conduct, as subject of preëmption and monopoly, not only the masses just mentioned are included, but motions and powers, even gravity, mechanical properties, physical forces, chemical activities, vital phenomena of plants and animals, that may be covered by patents and their uses become a matter of legislation and diplomacy.

Definition of Human Industries.

The industries here discussed are chiefly the commonest trades and daily occupations of men, in which material substances and terrestrial forces are involved. However, as Mr. Spencer and other writers on dynamic anthropology well observe, even the most intellectual and spiritual activities of men have their operative side, their apparatus and sensible processes. The earth not only modifies the trades and crafts, but all human activities, however evoked.*

1. In the first place, I ask you to remember that every action in every industry, in every climate, and every status of culture involves five substantial elements:†

a. Raw materials in endless varieties and attributes.

b. Motive power of man, beast, fire, air, water, gas, hard substances, chemistry, electricity.

* The reader cannot afford to neglect a little book by Thomas Ewbank, entitled, "The World a Workshop; or, The Physical Relationship of Man to the Earth." N. Y., 1855, Appleton.

† These are in addition to the formal or intellectual cause, of Aristotle.

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c. Tools and machinery, including both their manual or operative and their working parts and the mechanical powers involved.

d. Processes, simple, complex, and compound—that is, single motion for single function, many movements for simple function, many motions for many functions.

e. Products ready to supply desires or give satisfaction or to enter as material into new series of changes.

The progress of mankind means the greater and greater elaboration of these—more uses or functions for the same species of material furnished by the earth, more species of the earth's materials for each function or piece of work; more uses for each form of power, and more forms of power involved in the same use; more parts to the handle and working portion of the same tool, and more tools for the same operation; more movements or forms of motion in the same process and a greater variety of processes to compass the very same result; more elements or products of industry to gratify a single desire, and the creation of new and more exacting desires by the refinement of society.

2. I beg you to hold in mind, secondly, the fact that all voluntary human actions are carried on to satisfy wants or needs, bodily, mental, spiritual, social, beginning with the lowest animal cravings and ending with the highest aspirations of the most exalted men; also you must remember that these needs have been developed and organized by a larger and larger acquaintance with the earth and its resources.

The order of arising of these wants, both in the child and in the race, have been for food, rest, shelter, clothing, defense. The order of intellectual wants was in the same lines. Each craving has grown from simplicity and monotony to variety and complexity, involving more activities in the same process, more and more varied mental processes in the same activity, ending with coöperative thinking of higher and higher order.*

3. Remember, thirdly, that these industries for gratifying desires may be grouped into the following classes as regards the earth, together constituting a cycle and each involving the five elements before named:

* *Cf.* Lester F. Ward, Dynamic Sociology, 1893, 2 vols.

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a. Going to the earth for raw materials—fishing, hunting, gleaning, lumbering, mining. Some of these may be enlarged by cultivation and domestication in order to stimulate the generosity of the earth.

b. Carrying, hauling, transporting, in any stage of manipulation, using the powers furnished by nature.

c. Manufacturing, changing the physical, chemical, or vital form, or the size or shape, or combinations of materials for some useful end.

d. Exchange, barter, buying, selling, with all the handling that is involved. In this there is a rude mimicry of the correlation and conservation of energy.

e. Consumption, the storing and using up of the finished product, either to wear it out or to make it the raw material of another cycle of activities of the same kind. In brief, the sum of human industries is the arts of exploitation, cultivation, manufacture, transportation, commerce—extremely simple in primitive life, infinitely complicated and interlocked in civilization. The industries of men, from this point of view, are the transformation of terrestrial materials, by means of terrestrial forces, according to processes of which the earth set the earliest examples, and all this to gratify human desires.

The Earth as the Producer of Mankind.

The earth is the mother of all mankind. Out of her came they. Her traits, attributes, characteristics they have so thoroughly inherited and imbibed that, from any doctrinal point of view regarding the origin of the species, the earth may be said to have been created for men and men to have been created out of the earth. By her nurture and tuition they grow up and flourish, and folded in her bosom they sleep the sleep of death.

The idea of the earth-mother is in every cosmogony. Nothing is more beautiful in the range of mythology than the conception of Demeter with Persephone, impersonating the maternal earth, rejoicing in the perpetual return of her daughter in spring, and mourning over her departure in winter to Hades.*

*See also Hill, Genetic Philosophy, N. Y., 1893, Macmillan, and the teachings of Max Müller's school in the interpretation of Aryan mythology.

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The human race is put into relation with all bodies through gravitation, with all mineral, vegetal, and animal substances through the laws of physics and chemistry; with the vegetal and the animal kingdom through the additional phenomena called life, and with all animals through mentation.*

The Earth as a Storehouse of Materials.

The earth is also a great warehouse of materials of infinite qualifications for gratifying human desires.

This is apparent enough to any one who reflects about it, but few persons think of the long ages during which these substances were being compounded and compacted. These materials are the foundation of all technique and all styles of technique—textile, plastic, graphic, glyphic, tonic, and landscape. For them the earth not only furnishes the raw stuffs, but the apparatus and different motives to different races.

We should not overlook the fact, however, that the greatest care of time has been bestowed on that thin pellicle of the earth called the soil, from which come our food, and that of our domestic animals, our clothing, our habitations, our vegetal and animal supplies, and even the sustenance of the marine products upon which we prey. I have not time in this place to speak of the labor bestowed by nature upon what Professor McGee calls "the veneer of brown loam," out of which the most of human activity has sprung.†

Before quitting the subject of the study of the earth as a warehouse the student ought not to overlook the varied characteristics of these resources. The qualities of things are the earth's, the grains and colors of the same stone, the elasticity and fibres of timber, the plasticity and temper of clays, the malleability and ductility of the same metals, and so on. So marked are these that in our higher civilizations we must have iron from half a dozen countries to conduct one of our complex establishments.

* See de Quatrefages, L'Espèce humaine, 12, Bib. Sc. Internat., Paris, 1877.

† Henry Balfour: Evolution of Decorative Art, London, 1893, Percival. W. H. Holmes: Evolution of the Æsthetic, Proc. A. A. A. S., xl, 239. W J McGee: The Mississippi Old Field, A. A. A. S., 1891. But especially Ruskin in "Modern Painters," and, indeed, in all his writings about art.

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The very diversity of the same material from place to place has resulted in the production of the greatest possible variety of skill.

How quickly the lower races of men recognized these qualities and put them to use, not only discovering that stone is flaky and bois d'arc elastic, for instance, but that there are certain conditions under which these qualities exist more favorably than in others.

The Earth as a Reservoir of Forces.

The earth is also the reservoir of all locomotion and power useful to man.* Even the strength of his own limbs and back is derived from the food which she bestows. I do not speak of that, however, but of the substitutes therefor. She gives to the North American Indians the dog, to the South American the llama, to the people of the eastern continent the horse, ass, camel, elephant, and ox to convey them about and to carry or draw their loads.

The winds blow upon the sails and turn the mills, the waters set in motion the wheels and transport the freight. The steam is a still more versatile genius of power, and electricity just enters upon its mission. Coal, as a cheap source of energy, enables men to substitute for areas of raw material areas of manufacture and, indeed, to create areas of consumption.

The several kingdoms and forces of nature give rise to their several bodies of arts, each of which springs from the earth, and their investigation may be named as follows:

1. Physiotechny, of arts dependent on the physical forces of the earth.
2. Pyrotechny, of arts of creating and utilizing fire.
3. Anemotechny, of arts based on uses of the atmosphere.
4 Hydrotechny, of arts based on the uses of water.
5. Lithotechny, of arts based on uses of minerals and rocks.
6. Phytotechny, of arts based on uses of plants.
7. Zootechny, of arts based on uses of animals.

It would occupy too much space were I to elaborate in the most elementary manner the methods in which domestic animals,

*"A great factory or shop of power, with its rotary times and tides." Emerson, Letters, &c., 135, Bost., 1883.

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wind, fire, water, elasticity of solids, elasticity of gases, explosives, chemical action, magnetism and electricity had enrolled themselves in the service of mankind merely to furnish power to do the work that in the simplest form is done by hand. Every one of them must have struck terror into the hearts of the first men. By being subdued they obeyed the principle that I have previously laid down of increasing their own usefulness and indispensableness by creating and complicating new wants.

The form of the globe, its coast lines, elevations and reliefs, the amount of sunshine, the properties and contents of the atmosphere, the varying temperatures, winds, rainfalls, the springs beneath the surface, the waterfalls on the surface also act as motives, if not as motive power to all apparatus and all the movements of men.* We cannot eliminate the heavenly bodies from this enumeration, since they furnished clocks and almanacs and compasses to primitive peoples, and longer voyages were undertaken by their guidance in the Pacific than were made two centuries later in the Atlantic by Columbus with the aid of the mariner's compass.

The Earth as a Teacher of Processes.

Exploitation and cultivation, manufacture, transportation, exchange, consumption, as I have previously said, together constitute the round through which commodities are conducted in the progress of industries. The proposition is that the earth was in the beginning and is now the teacher of these activities. There were quarriers, miners, lumberers, gleaners, and, some say, planters; there were fishermen, fowlers, trappers, and hunters before there was a *genus homo*. There were also manufacturers in clay, in textiles, and in animal substances before there were potters, weavers, and furriers; there were all sorts of moving material and carrying passengers and engineering of the simplest sort. It might be presumption to hint that there existed a sort of barter, but the exchange of care and food for the

* Gardiner G. Hubbard: Relations of Air and Water to Temperature and Life, Nat. Geog. Mag., Wash., 1894, vi, 112–124. N. B. Emerson: The Long Voyages of the Hawaiians, Honolulu, 1893. A. W. Greely, Internat. Pressure and Storm Charts, Signal Office, Wash., 1892.

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honeyed secretions of the body going on between the ants and the aphidæ look very much like it.

The world is so full of technological processes brought about among her lower kingdoms that I should weary you in enumerating them. Stone-breaking, flaking, chipping, boring, and abrading have been going on always, by sand-blast, by water, by fire, by frost, by gravitation. Archæologists tell us that savages are very shrewd in selecting bowlders and other pieces of stone that have been blocked out and nearly finished by nature for their axes, hammers, and other tools.*

In tropical regions of both hemispheres where scanty clothing is needed certain species of trees weave their inner bark into an excellent cloth, the climax of which is the celebrated tapa of Polynesia. Furthermore, the fruits of vines and trees offer their hard outer shells for vessels and for other domestic purposes, for adornment of the persons, and as motives in art and handicraft.

Among the animals there is scarcely one that has not obtruded itself into the imaginations of men and stimulated the inventive faculty. The bears were the first cave-dwellers; the beavers are old-time lumberers; the foxes excavated earth before there were men; the squirrels hid away food for the future, and so did many birds, and the last named were also excellent architects and nest-builders; the hawks taught men to catch fish; the spiders and caterpillars to spin; the hornet to make paper, and the crayfish to work in clay.

2. The very genius of transportation and commerce also is taking commodities from places where they are superabundant and from ownerships where there is an excess over needs and placing them where they are wanted. It is a change of place to relieve excess and to supply demands. The savages had their changes of place and of ownership, constituting a primitive or elementary commerce, having all the characteristics of the modern; but I am now speaking of something that preceded even this. Nature had her great centers of superabounding material and took pains to convert this excess into supply against scarcity. She had devised her balance-wheels to effect uniformity of life and to preserve it against famine and failure. In illustration of this let me point out two or three examples:

* Consult the papers of J. D. McGuire in the American Anthropologist.

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a. She stored up the excess of one season to supply the scarcity of another season of the year. Many examples of this could be cited. All over the earth bees gather honey from ephemeral plants that man cannot eat and store it away in enduring form to be used by man in time of need. In certain regions of California the piñon seeds grew so abundantly that the Indians could not gather them; but the squirrels did lay them up in vast quantities, fed on them in winter, and themselves were eaten by the savages at a time when meat diet was most necessary, and gave to the Indians a lesson in economy and storage.

b. She used the excess of one locality to supply the dearth of another locality. In some places along the great lakes the wild rice (*Zizania aquatica*) covers thousands of acres and feeds millions of water fowl. These same creatures are the source of food for the Eskimo, who never saw a spear of grass nor ate a mouthful of vegetal diet. They are also wonderful teachers of the art of migration. Seeds of plants entered into this natural transportation through rivers and ocean currents, through winds and by the agency of birds, even of migratory birds, and set up in their progeny new centers of supply on distant shores.

c. But the most marvelous of all these commercial enterprises of nature is that in which she converts apparently inaccessible and unutilizable material into inexhaustible supplies for every industry of man. A wonderful example of this is found in the littoral feeding grounds. There is a bench of land under the sea skirting every shore and reaching under all estuaries. It is not deep. Indeed, it is the connecting link between the land and the profound sea. Upon this plateau the débris of the fertile lands and fresh waters are daily poured and myriads of the lower plants and animals are developed. Here are nourished cod, shad, herring, salmon, oysters, clams, and so on. The fish, after attaining maturity, actually swim up to men's doors to be captured; also upon this feeding ground are nourished the sea mammals, which have been indispensable to the life and happiness of our northern aborigines. It is true that every useful plant is converted by nature out of material which men cannot use. Long before Texas cattle were bred in one place and driven hundreds of miles to market, nature reared fish and walrus

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upon her enormous pasture-lands under the sea and drove them to market herself.

3. From one point of view the languages and literatures of men have been taught and suggested by the earth. Many words in all languages are imitations of the cries and sounds of nature. The motions and actions of her creations and creatures give rise to names for our common activities. By figures of speech the conduct of these beings furnishes the literary man and the moralist with means of graphic and pleasing description.*

Furthermore, every act is an expression of thought, and everything made by men is a testimony to the intellectual life of the man who made it. Even our most poetic and spirituelle conceptions find their counterparts in phenomena around us.

4. The earth has furnished man with examples of many forms of social life, from the absolute promiscuity of gregarious creatures to the monogamy for life among the eagles. The problems of society, clanship, government, and politics were working themselves out under the eyes of primitive man.†

5. In the forms of its creeds and its cults, humanity does not seem to be able to get away from earthly patterns. The Elysian fields, the Valhalla, the life that now is, reflected upon the life beyond, are all shaped after models familiar upon the earth. Likewise the cults of men, involving places of worship, social organization, times of meeting, festivals, and the like, necessarily depend upon climate and environment generally. There is a true sense in which religion is physiographic and in its lower forms entirely naturistic.

In her rôle as teacher, however, the earth always compels her pupil to make his own research and applications. I have heard it said of Bishop, the mind-reader, that he would, when blindfolded, find objects that had been secreted at a distance by sim-

* Consult Cushing. Manual Concepts, Am. Anthrop. Bushnell, Horace: Moral Uses of dark Things, N. Y., 1868, 8vo. Weale, J. M.: Derivation of Sounds in Language from Noises made by Animals, Rep. Brit. A. A. S., Lond., 1892-'3, 907. C. Lloyd Morgan: Animal Life and Intelligence. Sir Arthur Henry Helps: Animals and their Masks, Lond., 1883.

† Lubbock, Ants, Bees, and Wasps, N. Y., 1882, Int. Sc. Ser. On the Senses and Intelligence of animals, *ibid.*, vol. 65. Wood: Our Insect Allies, Lond., 1884, 238. C. V. Riley, Presidential Address, Biol. Soc., Wash., 1894. F. Houssa: Industries of Animals, Scribner, 1893.

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ply holding the hand of the one who hid them. He relied upon the involuntary or unconscious resistance of the concealer to guide him. When the resistance ceased he knew he was going wrong. I have figured to myself the forces of the earth holding progressive peoples by the hand in the same manner. *She* knew where all the good things were concealed. They find them when she resists. When nature does not resist us she is leading us astray, when she unconsciously holds us back we follow to success in the lines of greatest pressure.

The Earth as a Whole an Organized Structure.

Indeed, whatever view my hearers may take of the creation of the earth, and of its resources, and of man, the earth must be looked upon as a thoroughly organized object. You may not believe in the old doctrine of the "Spirit of the world," the Weltgeist of Goethe, and still no living being seems to work with greater harmony of parts. An intelligent spirit seems to be present everywhere, whose conduct is always consistent, whose actions may be predicted for years in advance. Nay, more, this spirit seems to be endowed with like passions as we are and to act for the best interests of men's spirits, helping and cheering the wise, discouraging and demoralizing the negligent. The whole conduct of our globe is of such a character, all its activities and resources are so thoroughly one throughout, that in every respect we are justified in speaking of it as an organism, a being, a creature, a body of living forces, a congeries of intelligent resources. It is in this quasi-active sense that I wish to regard it now in relation to the elements and results of human trades and industries.

Little change has taken place in the globe since man stood first upon it, a naked and inexperienced being. The planet itself was at that time fixed in its orbit and the moon now shines upon the earth at night as it did upon the first man. The sun has, almost unchanged, been witness of all human history. The amount and movements of the atmosphere have not varied perceptibly, though the air may now be deteriorating and the soil wasting through human agencies. The minerals in the bowels of the earth, the genera of living plants and animals are older than man. They were here for his use before he was born.

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Continental land masses, oceans, seas, and rivers have altered only a little since the *genus homo* came to dwell upon them.

This is an important series of facts in our study, because the other element of the problem will be an exceedingly variable quantity. The evolution of the earth was complete when man came to stand upon it. The evolution of human arts began where the evolution of the earth left off.

This subject of the whole earth directing human industry may be viewed from two different points—the technic side, or that in which the trades and invention come into prominence, and the physiographic side, or that in which the active forces of nature as determining the trades are more conspicuous. From either point of view there will be seen an orderly procedure, a movement as though some pilot held the helm. Regarded from the former, the genius of man of families, or races, of epochs, seems to be the active and only cause; regarded from the latter, the puissant earth seems to have been more the leader, mover, suggester.*

The Culture Areas of the Earth.

Besides this general view of the earth as an organized series of materials and forces, it is necessary also to study it in parts, to anatomize it, as the zoölogists would say. The most cursory glance reveals the fact that there are certain well established worlds within this world. This earth, which seems to be an oblate spheroid, all parts of which are approachable from the rest and their functions almost interchangeable one with another, is made up of great isolated parts or patches, which may be denominated culture or inventional areas, *Oikoumenai* of Aristotle. Each one of the areas has a climate of its own, waters and lands of its own, plants and minerals and animals; indeed, a physiography of its own; so that when a group of human beings have, in the fortunes of existence, found themselves in one of these

*Upon the antiquity of the general plan of earth structure consult J. W. Powell: The Laws of Hydraulic Degradation, Science, N. Y., 1888, xii, 229-233; also his Colorado River volume. C. E. Dutton, Monograph, ii, U. S. Geol. Survey, 72, 219, and An. Rep., ii, 60, 61. C. D. Walcott: Geologic Time, J. of Geol., Chicago, 1893, i, 239-676.

The author has developed the inventor's side of the question in a series of papers on Primitive Inventors and their Patents.

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spaces they have been irresistibly developed into a culture and trades and industries of their own. This was the centrifugal stage or the evolution of industries. It was just as though they had cut themselves off from the rest of their species and gone to inhabit another world.*

The forces acting to create these culture areas were, first of all, earth forces, the same that were at work to build the earth. After the general plan of the entire structure was laid down, the fitting and furnishing of the various apartments was a matter of local appropriation of these forces. Solar heat, moisture, terrestrial forms and movements horizontally and vertically coöperated in each area to stamp upon it the type of its life. The result in each instance was to create a series of conditions suitable for some lives and not for others, suitable for man in one stage of his culture journey and not in others. In regard to the capability of meeting man's necessities, the regions of which we are speaking may be thus characterized:

1. Areas of discouragement, too cold, too hot, too wet, too dry, too elevated, malarious, infested with noxious insects or beasts, too thickly forested. By and by these very regions might become centers of greatest activity.

2. Areas of monotony. Upon this point Schrader uses the following comparison:

"Life commenced in the water, where the changes of light, heat, pressure, food, and occupation were very slight, attained

* "I take leave to use the Greek term *oikoumenē*, which denotes any considerable portion of the earth's surface whose parts intercommunicate, but which is isolated from the rest of the world." Payne, Hist. of America, Oxford, 1892, Clarendon pr., i, 27, quoting Aristotle, De Mundo, iii: The order of development of the *oikoumenē* was, 1, the creation of small, isolated areas; 2, the commingling of areas; 3, the establishment of one area, the world embracing *oikoumenē*. These culture areas are called "Geographical provinces" by Bastian and "Areas of characterization" by de Quatrefages. See D. G. Brinton, Races and Peoples, N. Y., 1890, Hodges, 94, quoting: Haughton, Lect. on Phys. Geog., Lond., 1880, 273; —Bastian, Zur Lehre von den geog. Provinzen, Berlin, 1886;—De Quatrefages, Hist. Gen. d. Races Humaines, Paris, 1889, 333;—Achelis, Die Entwickelung der Modern Ethnologie, Berl., 1889, 65;—Darwin, Descent of Man, 169. See also Le Bon, The Evolution of Civilization and the Arts, Pop. Sc. Month., N. Y., 1892–'93, xlii, 342–349. F. W. Parker, The Relation of Geography to History, Nat. Geog. Mag., Wash, v, 125–131.

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its complete development on the land, in an element more delicate and more mobile, in the midst of reactions more multiple and more varied."

This same rule applies to the lands themselves. Those in which men occupied a homogeneous environment were like the sea, and the people were little differentiated. The arctic regions in their marine mammals and semi-aquatic men furnish a good example of this class.

But in the equatorial regions of the globe there occurs much of the monotony of environment which characterizes the circumpolar region. In the latter man exhausts himself in his efforts for subsistence; in the former he does not develop because nature supplies his few wants and at the same time overwhelms the work of his hands; but in Australia all the unfavorable conditions of human existence are exaggerated. Isolation, aridity, want of indentations and relief, absence of useful plants or animals; these negative conditions are certainly, of all in the world, least favorable to man.

Schrader follows the plan of establishing anthropological zones, but tidewater, Piedmont, and mountain areas are also important.*

3. Areas of two elements, two elevations, two seasons, two occupations, two wants. This will be exemplified further on.

4. Areas of many elements, with variety of climate, scenery, sources of material supply, and means of communication, stimulating the appropriation of nature's largess.

As regards the creation of races of men, these regions were ethnic areas. Respecting arts and industries, they certainly were technic areas, and therefore they were most important elements in the present study.

In the most primitive life exploiting, transportation, manufacture, barter, and consumption in each culture area extended

*Rev. Mens. de l'Ecole d'Anthrop., iii, 205–208, Paris, 1893, Alcan; also McGee, The Earth as the Home of Man, Saturday Lecture, 1893.

"Bananas and plantains are rapid growers, producing fruit in a twelve month. A constant supply is kept up during the year. The fruit is eaten green or ripe, raw, boiled, roasted, and fried. Humboldt says that on a given area it produces 44 times more nutriment than the potato; 133 times more than wheat. It reproduces perennially and abundantly and may be called an 'institution for the encouragement of laziness.'"—Squier, Mosquito Coast, 109, Lond., 1857.

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over little space, used only a few materials, changed their form only a little, were in the hands of a few persons, and their products were consumed on the spot. A Zuñi woman walks five miles to the mesa for clay, carries it home on her back, makes it into pottery, decorates and burns it, and then wears it out in cooking, water-carrying, or storing food. She is at once miner, common carrier, potter, artist, cook, and purveyor. Her culture area does not embrace more than 100 square miles.

Even now many of these separate culture areas, in spite of the mixing of people in the historic past, may still be traced. From the North American continent the savage has been nearly moved, but scholarship is able to lay down the home sites of all the historic families; the habitations of their various stocks are marked out geographically.

On the extreme northern limit of America there is a fringe of icy coast. You may commence to trace it in the northeastern corner of Greenland. The whole shore of this land mass forms a part of that area, down to Cape Farewell and up to Smith's sound. Resuming your journey about the southern limit of Labrador, you are to explore Baffin land, all about Hudson bay, among the islands of northern Canada, past the mouth of Mackenzie river all the way to Bering strait. The Arctic shores of both continents above and below these straits as far west as Lapland, in Norway, must be included, and the Alaskan coast as far down as Mount St. Elias. This is the Arctic, the interhemispheric world. . . .

Immediately in contact with this hyperborean oikoumenē is the birch-bark region, extending in both hemispheres. The house, the boat, the snowshoe frame, the vessels for food and water and for cookery, the lumber for all arts, and the food for much of the game are hence derived. It is the birch-bark country in space, just as we speak of the stone age, the bronze age, the steel age, in time. In early culture they did not ship birch wood and bark, but birch art sprung from birch environment. Geography was the mother of the arts. . . .

The land-locked inlets of America's northwest coast, extending for more than a thousand miles, being a safe and easy mode of communication between Thlingit, Haida, Tsimshian, Nutkans, and Coast Salish tribes, not only was there much borrow-

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ing of myth and speech and commingling of blood, but arts were interchanged and an incipient commerce engendered.

The great interior basin of the United States is arid, but abounds in excellent seed-producing plants, and here the people were bread-eaters and all the term implies. The plains of the great West were the abode of innumerable buffalo, and there the tribes, regardless of ethnic differences, were tall meat-eaters, dwelling in hide teepees, clothing themselves in skins, and practicing a hundred arts with reference to this one animal. On the east coast of North America were the clam, oyster, turtle, abundance of mackerel, shad and herring, plentiful supply of wild fowl and mammals and fertile lowlands and diversities of wood for their implements. These varied conditions produced on the whole the finest Indians north of Mexico. The same careful scrutiny of the Mexican plateau, the Orinoco, or the Amazon drainage, of the three culture elevations of Peru, of the river systems of Africa, of the island groups of the Indo-Pacific, would, if we had time to go over them, show us that the common trades and daily toil of the people run in grooves like a train of cars. Each people had ransacked its own environment and got the best out of it that their grade of culture was capable of extracting.

It is not necessary to continue the enumeration of these technic areas of the earth. It may be truly said that each distinct zoölogical or botanical region was capable of developing a distinct body of arts. And, per contra, if there be found a people in possession of industries that are unique, then the region must be ransacked for the environment and resources that endowed and patronized these industries. The art and the craft are of the region. No people are to be held responsible for the development of any of nature's gifts if nature has never bestowed them.

In America, when it was discovered, the technic regions were not equally advanced in the culture of their inhabitants. In the valley of Mexico and in Central America and on the Pacific coast of the Andes were the highest arts. The western continent, as a whole, was not the best fitted by nature for man's advancement. The mammals would none of them yield their milk and there were no draught or pack animals except the dog in the north and the llamas in the south. All the arts of the new world were the works of men's hands; consequently the whole

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area of culture skill was little elevated compared with that of the eastern continents. But the Mexican and the Peruvian body of industries occupied the most artificial centers.*

The Earth as a Single Culture Area.

No sooner had the varied riches of different areas begun to manifest themselves to one another than human feet took up the march which has given the whole earth to the whole species, and promises to make of it, by and by, a single neighborhood. In short, the earth developed in isolated peoples a separate set of industries. With your permission I shall call it the centrifugal or outward movement.

Next, it brought these separate cultures together as a higher composite organization of industry, and tends at last to make all men dependent upon the entire earth. This you will let me call the centripetal movement.

The centrifugal movements were the actions of savages and barbarous peoples. The centripetal movements were toward civilization. The movements toward widening the oikoumenai were:

1. Intra-areal, or inside the geographic province to enlarge it.
2. Inter-areal, between small contiguous provinces.
3. Inter-regional, overstepping great natural barriers.
4. The march of aggressive campaigns.
5. Inter-continental, the beginnings of universal conquest.
6. Inter-hemispheric, the periods of great discoveries.
7. Universal.†

*The reasons for this are worked out in Payne's "History of America," volume i, with consummate skill.

†Indeed it would not be difficult to give examples of some of these in their order. The experience of every family and clan is expressed in the following schedule:

1. Family or Gentile expansion: "Behold now the place where we dwell with thee is too straight for us." 2 Kings, vi, 1.
2. Algonquian, Carib, Malayan expansion.
3. Ancient Mexicans and Peruvians; all the Mediterranean races.
4. Egypt, Assyria, Phœnicia, Rome, Germany, Russia.
5. Jenghis Khan, Alexander, Napoleon.
6. Columbus, Vasco da Gama, Drake.
7. The present attitude of the Caucasian race.

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The primitive occupation of different culture areas on the earth prepared the way for the diversification of the ways and means of gratifying human desires. This centrifugal man developed the culture areas and their arts. The more advanced centripetal man brought the arts together and thus provided for their universal distribution, elaboration, and perfection.

Barter and long journeys for subsistence, cultivation of plants and domestication of animals, the use of machinery, and the storage of food were not unknown to pre-Columbian Americans. In one grave near Chillicothe, Ohio, were found copper from northern Michigan, obsidian from Yellowstone park, mica from North Carolina, pyrula shells from the Gulf of Mexico.

Ivory hunting and other natural causes set the African negroes on the move before the days of recorded history, so that there is no longer a negro race. Their original neighborhood is not known; their languages are better means of classification than themselves; their arts are hopelessly mixed.*

In studying the migrations which might have led Mongoloid peoples to America, the escape from the regions of an ever-vanishing food supply in the rear and the pursuit of an inviting food supply in front played a prominent part. Two hundred years ago and more the upper Pacific, the Bering sea, and the plains of the great West contained far the largest storages of human subsistence in the world. The fish, the seacow, the Arctic mammals, the caribou, the buffalo, in a certain sense, peopled America.†

In the Indian ocean and the Pacific, six hundred years ago, the Polynesian race suddenly became the Norsemen of that area. In their improved canoes, with sails and outriggers, they set out from Tonga and visited Easter islands, on the east; Madagascar, on the west; New Zealand, on the south, and Hawaii, on the north, each journey being not far from two thousand miles from home. No other motive was assigned but to follow the leadings of nature to behold and enjoy more of the earth.‡

*The capture of women and slaves and other social causes urged on these movements, but these will be considered in another paper.

†Consult Payne's History of America for the importance of the food quest; also Morgan's Essay on Migration in Beach's Indian Miscellany.

‡N. B. Emerson: The long Voyages of the Ancient Hawaiians, p. 34, Hawaiian Hist. Soc., Honolulu, 1893.

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In this same Malayo-Polynesian area, especially in the region extending from Australia to Indo-China, there is a curious mixing of the regional question with that of race. Here dwell Negroes, Malays, Polynesians, and Australians; but the material out of which things are made, the implements with which they are made, and the products of industrial arts are clearly of the soil, and there is great confusion of industry and race, undergoing the process of transformation from segregation to unification.

Racial peculiarities overlap the natural elements of industry and the technogeographer and the ethnogeographer are merged into the ethnotechnologist.

The Mediterranean sea remained a barrier until many diverse civilizations were developed on its African, Asiatic, and European shores. It was at first a means of dividing peoples of the same race until they had elaborated their several contributions to industrial processes.

The second stage of industrial development had begun when the first column of Aryan history began to be written.

Of early Caucasian and Mongolian culture only a few hints can be given. In prehistoric times precisely the same law was in force which the American continent revealed to the eyes of the discoverers; but another state of things was in operation there in historic times, namely, the working out of the higher law of commerce and artificiality of life, in the operation of which the genius of man rises superior to natural barriers and exigencies and turns whole continents or the whole earth into one organized culture area or *oikoumenē*.

No one can tell the region that gave to man the cereals of Europe. It is said that rice is a contribution from southeastern Asia, but whence wheat, rye, barley, millet, oats? Fruits, like apples, plums, quinces, peaches, belong to the same category. The date may be accredited to Africa and the grape to many lands. But there is no account of our race at a time when the genius of invention was being developed through them in their separate *oikoumenai*. The historian was too late on the field to record the gathering of them in a wild state.

Likewise the domestic animals. The dog offered his services as a hunter and a beast of burden, the cat as the enemy of vermin; the cow, horse, ass, elephant, sheep, goat, camel, llama were

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furnished by nature to enhance the arts of food, shelter, clothing, manufacture, transportation, and to set an example of industry; but of the transition there is no record. The second stage of industrial development had begun when the second volume of Aryan history was about to be written.

The Earth in Relation to the Higher Artificial Life.

In primitive life culture areas were chiefly the regions where abounded the raw materials. They were in fact areas of natural exigencies. But in higher civilization the arts have usurped the prerogative of nature and created artificial culture areas. Plants have been made to grow and animals to thrive thousands of miles from their original home. Materials of all sorts are carried to manufacturing centers to be made up into forms for commerce and consumption. These are artificial technic areas, whose geography is an essential study in political economy.

For example, the Muskoki Indian woman used to go to the fields, gather the wild hemp, carry it home, soak it, hackle it, spin it, weave it, and then use it up on the spot. But on that very ground now grows the cotton, a foreign plant, raised by one man, ginned by another, hauled on wagons to railroads, thence carried to the sea and across it to great manufacturing towns, where it is hauled and spun and woven, and hauled and shipped and sold and sold until the product may be seen in every portion of the habitable globe. The geography of this one staple in its multiform transformations, brought about by the gradual appropriation of all the forces of the earth and then its movements until at last it has been caught in the current of every terrestrial wind and followed every world-encompassing oceanic stream, would exemplify what I am trying to say about the coming of the globe to be one united *oikoumenē*.

In all this the race has grown, not independent of the earth, but more dependent upon it. Artificial and domesticated supplies of material are as much from the earth as the wildest. Men in devising tools and machinery and engines to do the work of their hands have had to go to their mother for them. They use other forces than their own, but they are still forces furnished by the earth. They have multiplied invention upon

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invention, but every one of them is a device for using a great loan already in hand for the purpose of raising a larger one.*

At one time men simply breathed the air and moved about and clothed and sheltered themselves at its behest. It came gradually into human history somewhat as follows:

1. As a terrestrial force, chemical, mechanical, geological, and as supporter of life.
2. In the production of climate and temperatures and as instigator of clothing and habitation.
3. As distributor of seeds, insects, birds, &c.
4. As promoter of fire, draft, and the like.
5. In the distribution of pollen, microbes, and other minute organisms.
6. The mover of sails advancing from the use of local breezes to that of the trades.
7. The mover of wheels and machinery.
8. As an elastic force in mechanics.
9. In aërial transportation.
10. In science and religion.†

In this way fire wrought for man, first making his house, then as a master of his childhood, and last of all acting the part of maid of all work. The order might be summed up as follows:

1. Earth-builder, moving the strata vertically.
2. Fierce weapon against beasts, men, microbes.
3. Preserver of substances, food, and other material.
4. In cooking.
5. Artificial heater for the dwelling.
6. For illumination.
7. In mechanic arts.
8. In agriculture.
9. In locomotion.
10. In generating higher forces; in literature and myth.

After the same fashion it would be possible to enumerate the varied services of water:

1. Geological worker in vapor, frost, snow, rain, dew, and as carrier of materials.

* For the history of this power in nature, first to create the earth and then man, and then to bring the earth under the dominion of man, see Powell's lectures on biotic and anthropic evolution, Am. Anthropologist.

† In this last connection read Ruskin's "The Queen of the Air."

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2. In springs and wells and water works.
3. Carrier for man in rivers and open waters.
4. In artificial ponds for fish and irrigation.
5. In canals and enclosed basins.
6. In the undershot wheel.
7. In the overshot and the turbine.
8. In the form of steam.
9. In hydraulic mining.
10. In comprehensive service, as at Buffalo and in other cities.

The minerals, plants, and animals used at first by man could be counted on your fingers.

The growth of culture has increased the number of useful species as a whole, the functions of each one, the amount of labor bestowed upon each individual element, the depth of mines, the amount of waste, the distances traveled and the velocity of locomotion, the difference of weight between the passenger or freight and the weight of the train or the ship.

In this partnership between man and the earth the progress of culture has been from naturalism to artificialism; from exploitation to cultivation and domestication; from mere muscular power to more subtle physical force of man, of beast, of water, of air, of fire, of electricity; from tools to machinery; from simplest imitative processes to highly complex processes, involving many materials and motive powers and inventions; from short journeys to long journeys; from mere barter to world-embracing commerce; from monotonous and monorganic food and clothing, shelter and furniture, mental and social appliances to forms as complex and varied as the imagination can conceive. And when the supply gives out, it is not the earth that fails, but it is the comprehension and the skill of men. The race that used to drag out centuries in learning one letter of the industrial alphabet, leaving its offspring to repeat the process, now catches new secrets in every hour and perpetuates the understanding of them for posterity.

In that long journey from natural to artificial life the resources by which industries have been fostered underwent varied fortunes. In another place I have characterized the periods of human land or earth holding:

1. The period of earth building and soil building—man absent.

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2. The period of harmless dependence. The earth took care of man, who did little to waste the earth.

3. Man attacked the earth with firebrands, burning forests and creating wastes. The style of agriculture called coomry in India had here its incipiency.

4. The age of mining began, the bow and the harpoon were invented and the wholesale destruction of animal life set in.

5. The commencement of plowing—that is, of the era of wasting the soil and sending it to the bottom of the waters.

6. The age of subduing the natural forces, the commencement of machinery.

7. The beginning of economy.

8. The age of artificial production and propagation.*

In this evolutionary process some of the materials and plants and animals were:

1. Destroyed irrevocably.

2. Converted into other forms, domesticated, and preserved.

3. Abandoned and more useful materials took their places.†

The fate of natural forces and resources may be summed up as follows:

1. The sun's heating, illuminating, and chemical power unlimited and inexhaustible.

2. Consequently, wind and water power and electromotion beyond the capability of man to exhaust.

3. The mineral kingdom—most easily wasted, air vitiated, water contaminated, fuel exhausted, soil washed away, and its most delicate ingredients used up forever—receives the most anxious thought of legislators. For the wasted soil man finds a partial compensation in irrigation and in the subaqueous feeding grounds. Chemistry is making long strides to render the species independent of the fertile portions of the soil.

4. The fate of the vegetal kingdom is easy to predict. The useful plants will be preserved and multiplied; those that are useless and noxious will be treated with indifference or extermi-

* "The Land Problem," Lectures Brooklyn Ethical Assoc., N. Y., 1892, 119.

† W J McGee: The Mississippi Old Fields, A. A. A. S.,1891. G. P. Marsh: The earth modified by human action, in "Man and Nature," N. Y., 1864, Scribners.

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nated. For a long time, however, the natural supply will be more than sufficient.*

In the three elements of food plants, fibre plants, and forest production the world seems stocked for all time.

5. Animal life must become altogether subservient to man or at least innocuous. Capabilities of variation and multiplication are unlimited both on land and in the sea. Indeed, the marine life of the great estuaries and coastal plane will restore to man a portion of his losses through denudation, impoverishment of the soil, and through sewage, and species of animals now useless will be yoked to service.

You can see how these transitions from discrete and independent culture areas to one, all embracing *oikoumenē*, must modify the politics and the thought of the world. Little did the Bongo smith care about ships or trains, about treaties or tariffs. His materials were at hand, his motive power was his good right arm, his tools were the hardest rocks he could find, his transportation was a short haul on human backs, his commerce was barter, his goods were consumed near by.

While the higher life of industry was being elaborated by the commingling of diverse occupations, the peoples were commingling under other motives. Old, natural barriers were swept away, it is true, but new, artificial, political barriers were set up, often making war across industrial boundaries and interrupting the proper flow of the true culture. The state boundaries of the United States are excellent examples. Indeed, the bloody wars that have cursed the earth have been for the most part for the possession of its material resources by peoples having false artificial limits.

The higher life of industry, the true artificial life, by the commingling of the arts that were severally developed in culture areas, found itself at war with the ethnic life, which has formed itself on entirely different principles.†

The end is hastening, however, when the false and unnatural political boundaries will be swept away or ignored, the non-

* See Riley on the enormous amount of honey that goes to waste through want of bees to gather it.—Presidential Address, *ut supra*. (quoting Meade on the best fruits).

† Gardiner G. Hubbard: Geographic Progress of Civilization, Nat. Geog. Mag., vi, 1, Wash., 1894.

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progressive races extinguished or driven to the suburbs, the play of world-wide action left unincumbered, the flow of world-embracing commerce unimpeded, and every desire of man will be gratified. The development of this higher law of technogeography is left for another occasion.

In conclusion, let me call your attention to the beneficent effect of this alliance between man's arts and the earth. The law seems to be one of mutual blessing and mutual cursing. Poor farmers, poor fishermen, poor miners occupy the worst land or fishing grounds or mines. Each mutually degrades and impoverishes the other. The reverse is true of the shrewd and industrious.

Now, what is fact of these single workers was true of tribes, hordes, races, peoples.

The right progress looks forward to a time when the whole earth will have been exploited, every pernicious plant and animal and man or tribe of men removed, and all that is good domesticated; when the powers of nature will all be harnessed or enslaved; when distance and time will offer no impediment to commerce; when it will be as easy to put production and consumption in friendly union at the springing up of desire as it was for the primitive man or woman. The earth will be subdued by men who will say to the mountains, "Be ye removed and be ye cast into the sea, and it shall be done, and the desert shall blossom as the rose."*

* Already the flooding of the Sahara, the digging of the Suez canal, the interoceanic highway between North America and South America admonish us of the coming end. In primitive times the animals found the tracks across the mountains; the hunters followed the trails; the trains of pack.animals followed the hunters, and by and by came wagon roads and railroads. The savage formerly walked across the water-sheds, then he made portages, then men dug canals, and finally they tunneled the mountains and united all the seas.

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THE KINSHIP OF A TANOAN-SPEAKING COMMUNITY IN TUSAYAN.*

BY J. WALTER FEWKES.

The present article has been prepared as a contribution to the knowledge of the racial affinities of the village Indians of Tusayan. In former articles in *The Anthropologist* I have claimed that the Hopi stock is composite, made up of assimilated additions from Sonoran, Tanoan, Athapascan, Shoshonean, and other tribes. I cannot, therefore, accept the generally received idea that the Hopi have a large enough proportion of pure Shoshonean blood to classify them with other tribes of the Shoshonean stock. Whatever the nearest kinship of the Hopi may originally have been, it is believed that data can be collected in the villages bearing on what it has now become. We may justly expect to find important legendary evidences to guide us in forming a judgment, and evidence of this kind has already been used in support of the theory of the composite nature of the Hopi people. Linguistic evidence, too extensive in character to discuss in this place, likewise tells in its favor; but these arguments indicating the kinship of the race in the past can be supplemented by evidence bearing on its consanguinity at the present time.

The object of this article is to show how far the process of amalgamation of the last important Tanoan addition with the Hopi has gone and how much it has been affected by its neighbors.

It is a well-known fact that Hanoki (Hano, or Tewa), one of the three villages on the East Mesa of Tusayan, is inhabited by those who speak a Tanoan dialect. The date of the arrival of their ancestors in Tusayan is approximately known to be about the beginning of the eighteenth century. It is proposed to discuss how much this stock has been changed during the two

* This article was written while the author was attached to the Hemenway Expedition.

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centuries or less which have elapsed since its advent, and incidentally to touch upon the question of how much it has affected the original Hopi stock with which it has been in contact. The latter inquiry, however, is subordinated for the present to the main question, as it cannot be treated intelligently until the data regarding the clan relationships of the neighboring villages, Walpi and Sitcomovi, have been collected *in extenso*. It is plain, I think, that if we can show that a considerable intermarriage of pure Tanoan and Hopi people has occurred we have advanced a step in the direction of a true interpretation of the kinship of the dwellers on the East Mesa, to which, it may be said, *en passant*, our discussion is purposely limited in this article.

There is a historical probability that the departure of the Tanoan colonists from the Rio Grande country and their advent among the Hopi, between the years 1690 and 1710, may have been results of outbreaks against the Spaniards; but it is significant that it is almost universally said by the Hopi that the destruction of Awatobi, which occurred at the close of 1700, took place before the arrival* of the Tewans in Tusayan. As the Tanoan additions to the Hopi communities had the reputation of being "fighters," they would naturally have taken part in the massacre had they been in Tusayan at that time. It is more logical to suppose, as their legends distinctly state, that they arrived in Tusayan after the overthrow of Awatobi.

The language and traditions of the present community of Hano amply prove that the nucleus of the village was Tanoan. The reason they left their home, the route which they took, and their reception in Tusayan are recounted with many details in the stories of the present inhabitants. If any faith can be put in evidence derived from folk-lore, the fact of their origin from the Rio Grande region is well established. Their language, with slight variations, the investigation of which offers an interesting

*The Hopi say they invited the Tewans to settle among them. There is historical evidence that an "embassy" of the Hopis visited the Rio Grande region at about the time the Tewans departed. I refer to the visit of an "Oraibi chief" and twenty other delegates to Cubero in October, 1700. How long after the destruction of Awatobi the Tanoan ancestors of the Hanoans arrived at the East Mesa is not known. The fact that it occurred shortly after the presence of the "embassy" in Santa Fé is significant.

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field of study, is similar to that spoken in other Tanoan communities.* There is also good evidence, from a universally repeated legend among them, that the Hopi did not speak or understand the Tanoan language when the Tewans arrived. These are accepted facts which have not been doubted by any prominent student of the Tusayan people. Our discussion, then, is to bring out evidences of the rate of assimilation of a party of Tanoan colonists with the original Hopi † during two centuries, as indicated by the blood kinship of their descendants.

It must be mentioned, however, that the problem is somewhat complicated by the fact that there is historical and legendary authority that other delegations of Tanoans besides that which we are to discuss came, either as refugees or voluntarily, among the Hopi, about the same time. The so-called Asa people are claimed by the Tewans as their kindred, and they both probably left their homes in the east simultaneously. The route which these two contingents took in their migration is said to have been different and the Asa people left some of their number at Zuñi, where their descendants still live. It is likewise said that after they had lived some time with the Hopi a number of them wandered off to the Tse-yi ‡ cañon and intermarried with Athapascan (Navajo) clans. It was thus brought about that they forgot their Tanoan language and spoke Navajo. But

* The Tusayan Tewans recognize the following pueblos as belonging to their original stock, and having their speech: San Juan, Santa Clara, San Ildefonso, Pojoaque, Nambé and Tesuque. The idiom of Taos and Picuris is, they say, a mixture of their own with another, although they claim these two as kindred. The *Ka-wai'-ka* (Keresan) or Laguna tongue is, according to them, mixed with Tewa in Sandia and Isleta. They regard the language of Jemez as different from *Ka-wai'-ka*. Although they recognize that the idiom of Isleta differs slightly from theirs they regard it as modified Tewan. The word Tanoan, to the use of which there are objections, is applied in this article to the speech of the six Rio Grande pueblos claimed by the Tusayan Tewans as their closest linguistic kindred. The determination of whether the differences in the speech of San Juan, on the one hand, and Taos and Isleta, on the other, is great enough to divide the Tanoan family into two linguistic divisions remains a problem. The claims of the Tusayan members of the family are worth consideration.

† Our article deals with the Hopi of the East Mesa, and the deduction may or may not hold for the other Mesa villages of Tusayan.

‡ Commonly, but improperly, called "Chelly."

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later they returned to Tusayan and became assimilated with the villagers then, learning Hopi as one result. It must then be borne in mind that present members of the Asa people have Tanoan, Hopi and Athapascan* blood in their veins.

We turn now to the blood kinship of the present dwellers in the village called Hano, where the Tanoan language still persists. What facts can be gathered there in regard to the results of the two centuries in which they have been associated with the Hopi?

As a contribution to an intelligent answer to this question Mr. Stephen, in his work for the Hemenway Expedition, has collected the following roster of the present inhabitants of the place, indicating their clan relationships and other significant data.

Summary of the Tusayan Tanoan Community.

	Men.	Women.
Pure Tanoan; *i. e.*, claiming Tanoan grandparents	27	30
Tanoan mother; Hopi father	14	7
Tanoan mother; Navajo father	2	5
Composite: Navajo, Asa, Tanoan or Hopi	3	7
Walpi, or Asa father and mother; married Tanoans	12	
Walpi mother; Tanoan father; married Tanoans	3	
Cipaulovi (Hopi) mother and father; married Tanoans	1	
Cûñopavi (Hopi) mother and father; married Tanoans	1	
Navajo mother and father; married Tanoans	2	
Pai Ute unmarried	1	
Doubtful	2	
Total adults	68	49
Tanoans living in Walpi	8	
Tanoans living in Sitcomovi	6	
Tanoans living in Cûñopavi	2	
	16	
Actual population of adults in Hano	52	49
Actual population of children in Hano	32	30
Population on December 1, 1893	163	

*This must be borne in mind in discussing the kinship of the Hopi with the Navajo, who are members of the Athapascan stock, according to the best authorities.

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Census of the Existing Tanoan Gentes.

	Men.	Women.	Boys.	Girls.
1. Ke′-to-wa (Bear)	1	4	3	2
2. Ku-lo^{n}-to-wa (Corn)	7	5	5	6
3. Sà (Pi-ba, tobacco)	2	5	6	3
4. Ten-yo (Pine)	8	10	6	5
5. O′-ku-wa (Cloud)	15	9	4	2
6. Nañ′ (Earth)	2	4	3	3
7. Ka-tci′-na (Ka-tci′-na)	9	12	5	9
8. Tañ′ (Sun)	1			
Husbands of Tanoan women; not belonging to Tanoan gentes.*	23			
Total	68	49	32	30
Infants			4	5
Children older than infants			28	25
Children of pure Tanoan parents			2	4
Children of mixed Tanoan parents			30	26

The Ka-pu′-lo (Crane), Pè (Timber), Ko′-pe-li (Pink conch shell), Po-hu′-lo (an herb), Ku-yan-we (Turquois ear pendant), Ku (Stone), and Ta (Grass) gentes are said to have become extinct since the Tanoans came to Tusayan.†

The most startling fact brought out by the summary given above is that there are only *six children whose parents claim to be*

*The matriarchal system prevails among the Southwestern aborigines.

†It must be borne in mind, in a study of the above summary, that as a rule the husband on marriage goes to the wife's home to live, and that the children of the union belong to her gens. It thus results that the Tanoan women do not move from the village in which they were born, and that their children remain in the environment of a Tanoan-speaking community. In this possibly we have an explanation of the fact that whereas most of the Tanoan residents of the East Mesa can speak Hopi, few of the Hopi speak Tanoan. The small number of Tanoan men who have married Hopi women make little headway in teaching their children their language, surrounded as they are by Hopi influences. On the other hand, the larger number of Hopi men who have Tanoan wives exert more influence in spreading their language, and the much greater predominance of Hopi people is a strong influence in diffusing their linguistic forms.

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pure Tanoan out of sixty-two, the complete enumeration. There are only six families in which the father and mother are both Tanoan. The mother of one family which has three of the six children is older than the child-bearing period, and by the restriction which forbids marriage within gentes the probability of pure-blooded Tanoan offspring from these children, when of age, is very much limited. It is not too much to say that in the next generation the percentage of pure Tanoan blood will be so small that we cannot regard the stock as Tanoan.

Of the adults it will be noticed that less than one-half the men and a little above this proportion of the women are Tanoan, and out of one hundred and twelve adults it will be seen that only fifty-four are pure bloods. Taken in connection with the small number of children of pure blood the modification in two generations is very significant.

The presence of twenty-three husbands of Tanoan women who do not belong to Tanoan gentes is a fact full of meaning. This condition has had a most important influence in determining the consanguinity of the stock.

The data in regard to extinct gentes simply means that the female line of these families has died out, although male descendants may still exist in Hano.

It seems legitimate to conclude from the summaries which have been given that the inhabitants of Hano are only in part Tanoan in their consanguinity, although speaking a Tanoan tongue. They seem to be more closely allied to the Hopi than to the Tanoan people of the Rio Grande, although both have differentiated from a common ancestral stock.

The persistence of the language of their forefathers, notwithstanding the changes in their blood kinship, illustrates in a striking manner a liability to error in supposing in all cases that two peoples speaking the same tongue are necessarily more closely related racially than those which are linguistically different. It is believed that in some cases, as a result of the rigid adherence to the matriarchal law, language may survive after racial kinship has changed. These possibilities are of profound importance in speculations as to the kinship of the Hopi themselves, as I shall try to show in subsequent articles.

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THE ORIGIN OF SACRED NUMBERS.*

BY DANIEL G. BRINTON, M.D., LL.D., D.SC.

An investigation into the origin of sacred or holy numbers should exclude the consideration of numbers used in merely classificatory and conventional relations, as those which naturally flow from the quinary, decimal, duodecimal, and vigesimal systems of numeration; and also the cabalistic, occult or mystic employment of numbers, so common in the secret philosophies, as these were conscious fabrications or adaptations, in a social condition far removed from that of primitive thought.

Confining the study to holy or sacred numbers as observed in the early civilizations and among tribes living in what we call primitive conditions, where the culture status still bears a distinct ethnic character because largely indigenous and spontaneous, I have reached certain conclusions which, so far as I know, have not heretofore been stated, at least neither so fully nor so definitely, by any of the numerous writers on this subject.

I shall present these in categorical form and then proceed to defend them.

1. The sacred numbers are preëminently 3 and 4, or derived from these.

2. These numbers represent contrasting or antithetic symbolic notions, and arise from wholly opposite mental perceptions.

3. The number 3 derives its sacredness from abstract, subjective operations of the intelligence, and has its main application in the imaginary and non-phenomenal world.

4. The number 4 derives its sacredness from concrete and material relations, from external perceptions, and has its application in the objective and phenomenal world.

5. The associations which attach sacredness to these numbers arise in the human mind, of the same character, everywhere and

*Abstract of a paper read before the Oriental Club of Philadelphia, February, 1894.

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at all times, so that no theory of borrowing is needed to explain identities or similarities in this respect.

6. Ethnic character, however, tends potently to develop especially either the one or the other, either the abstract symbolism of the 3 and its derivatives, or the concrete symbolism of the 4 and its derivatives; and, conversely, the preponderant development of the one or the other of these reveals, with instructive precision, the ethnic character of tribes and nations.

I. The "Three" Series.

All operations of the mind, all acts of intelligence, necessarily proceed in accordance with the three fundamental laws of thought, expressed in logic as the laws of Identity, Diversity, and Excluded Middle. These ever-present laws, though obscurely recognized, constantly exert their power in impressing a triple form on reasoning. Witness the form of the syllogism, or the logic of Hegel with its two antitheses reconciled by a higher synthesis, or the trilogies of the philosophy of Auguste Comte.

When, as in the mathematical logic of Boole, the syllogism is expressed in algebraic terms it is found to be represented invariably by an equation of three members, to wit, $x = x \times x$, or $x = x^2$, a symbolic notation which proves the triune nature of all subjective operations of the intelligence.

The two universal categories of the understanding (or modes of perception), Space and Time, invariably present themselves in a threefold aspect: Time as the Past, the Present, the Future, as expressed in the grammar of every language; Space, as Length, Breadth, and Thickness; or, with reference to position, Above, Beneath, and Here. The primitive perceptions of matter are likewise threefold: as solid, the earth; fluid, the water; gaseous, the air or wind.

The applications of these conceptions in mythology are most marked.

Time, as the past, the present, and the future, is represented by the three Norns of Teutonic myth, Urdhr (die Gewordene), Verdhandi (die Werdende), and Skuld (die Kommensollende). The three Fates of the Greeks correspond to these.

As the effects of Time conceived under this threefold aspect, we have the mythical concept of the threefold energy of the

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gods. For example, the Indian Trĭmurti, Brahma, creating; Vischnu, preserving; Siva, destroying; and the Egyptian triad, Isis, Horus, Osiris—birth, life, death. These are what the Vedas call "the three paths of Being." To this also we must attach the division of the year into three seasons, Spring, Summer, Winter, etc.

From the necessary threefold relation of Space and Position come such expressions as "Indra, Lord of the Three Worlds;" "Creator of the Three Worlds;" the "Threefold World," and the like; and in the Latin poets, "mundus triformis," "mundus triplex," "Jovis regnum triplex," etc.; also the division into the Upper World, the Under World, and the Earth Plane, which we find a primitive conception in every continent.

The Christian trinity will occur to all, as well as the trinities of Buddhism and many less important faiths. Indeed, we may almost agree with Mr. Westcott when he says: "It is impossible to study any single system of worship throughout the world without being struck with the peculiar persistence of the triple number in regard to divinity."

The Nine.—A development from the 3 is the 9—thrice 3. The 3 worlds, for instance, are again divided into three each, making 9, as we find in the nine worlds of Teutonic myth, in the cosmic notions of the Aztecs, in the "novem spheræ celestes" of the Latins, and in the *tridiva*, threefold heaven of Indra. The body in Sanscrit is called "the 9 mouthed" or "the 9 doored," from its nine openings, through which the soul goes in and out in its nine forms of ether or spirit.

The Thirty-three.—A further development is 33. Eternity, Aditi, Unendlichkeit, is said in the Vedas to have 33 sons. The gods who lived with Indra in the upper heavens were 33. They were the Maruts, the Winds, sons of Indra. The ancient Persians, in the Vendidad, reckoned the total number of divine beings at 33.

II. The "Four" Series.

The sacredness of the number 4 is derived directly from the relations of the human body to the external world about it, as I showed years ago in "The Myths of the New World." To a man, standing, space is distributed in front and behind him, to his

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right hand and to his left. The body itself is regarded as of four sides. The Persian Vendidad speaks of man as built "with four walls;" so the French say, "un homme carré" for a thick-built, strong man, and we speak of such an one as "square-built." Space being thus divided, the known world was spoken of as "the 4 quarters of the World," and the sunrise—that most important of events to man—marking one quarter, the others were counted from it, to give the 4 Cardinal Points. These were generally identified with the winds that came from them, regarded as gods, mighty powers, bringers of rain and fair weather, of heat and cold, of the life and death of vegetation; hence of the seasons, of fertility and of food.

Thus in ancient Rome Janus, the year god, was represented with four faces, "Janus quadriformis," and, as I have amply shown, throughout America the tribal mythologies, rites, ceremonies, beliefs, are constantly and profoundly governed and moulded by this sacred number. It was almost as prominent in many of the early nations of the Old World.

The Seven.—The sacredness of the number 7 is a direct development of the number 4, not a combination of the 4 and the 3, as might be imagined, nor yet independently suggested by external objects, as is generally supposed; such as the 7 planets, the constellation of the 7 stars, the 7 colors of the rainbow, etc. These were coincidences which doubtless strengthened its holiness, but that it originally arose from the four spatial relations is clear from its development in America and India.

These spatial relations are not exhausted by the four cardinal directions and the areas they embrace. That is horizontal space only; to be complete, we must add the three conceptions of vertical space, Above, Below, and Here. This gives the sacred 7, the type of completeness and perfection. To express this graphically on a plane surface requires a figure of 7 parts. Such a ceremonial diagram of the 7 "Ancient Spaces," or primeval cosmogonic areas, as understood by the Zuñi priests, has been shown by Cushing. It represents the North, South, East, and West, and the Zenith, Nadir, and Middle, thus exhausting the visible world. The observer is always supposed, wherever he is, to stand in the center of the middle space; there, in the sacred buildings planned in accordance with this view stood the altar;

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there, in the distribution of the population, was located the house or town of the holiest and highest priesthood (as in the "7 cities of Cibola," and the "7 caves" of Aztec legend).

The Thirteen.—This was also a derivative from the four, and carried with it the like associations of ideas. I have explained it fully, after Cushing, in my "Native Calendar of Central America" It arises from the addition of the celestial to the terrestrial notion of space. Both are supposed to have the same seven spaces or areas, but the middle of each is at one and the same spot—there, where the individual himself is. This, therefore, is counted but once, and the number 13 results. The steps of this process are perfectly demonstrable, and that they were precisely the same among the Sanscrit-speaking Indians of India as among the Zuñi Indians of our own land the following sentence from one of Prof. A. F. Potts' learned articles shows:

> In the cosmogonical system of the natives of India, the earth consists of either 4, or 7, or 13 "islands," *dvipa*, disposed around Mt. Meru as a center, like the petals of the lotus flower around its stamen. The central space or island is always India itself, regarded as the middle region of the earth, its navel, as were also esteemed by their own inhabitants, China, the Middle Kingdom; Delphi, the home of the oracle; Tibet, Jerusalem, and in America, Cuzco, etc.

This interesting extract is sufficient to prove conclusively not only the relationship of these three numbers, the 4, the 7, and the 13, but also that the process of their development one from the other was entirely parallel in the East and the West Indies. Our week of 7 days was simply a distribution of the time of a lunation as nearly equally as possible to the 4 quarters of the world, and to the gods or genii identified with them. Rather from such associations than from observation, must we explain the fact that many north Asiatic peoples and probably also the primitive Aryans counted 13 and not 12 lunar months to the solar year.

III. The Sacred Numbers as Ethnic Criteria.

As the 4 and its derivatives sprang from and remained connected with terrestrial and material relations, while the 3 and its derivatives arose from psychical and subjective sources, the predominance of one series or the other in the mythological

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symbolism of a nation becomes a criterion of its general tendencies, either toward a material or a spiritual life.

In the American and Mongolian races the 4 and its derivatives are almost exclusively the ruling holy numbers, whereas the numerous triads and trilogies of the white race, as represented by the Egyptians, Greeks, ancient Germans, Kelts, Slavs, and Aryan Indians, are familiar to all scholars, and have been pointed out in ample detail by Simrock, Potts, and a host of other writers.

The ancient Babylonians, whoever they were, seem to have had a decided preference for the 4 and its derivatives, and from them probably the early Semites drew the superior sacredness which, as we see in the Old Testament, they so pointedly assigned to that series. This profound ethnic contrast, original or derived, prevented them, when the religious sentiment reached a high development, from accepting the doctrine of the trinity, though as an abstraction of speculative thought, it is quite as elevated as the concept of unity. The latter is inconceivable except by the laws of identity, contrast, and exclusion, which forces it at once into a trilogy.

In some primitive nations both series were developed side by side, though rarely with equal vigor, while in the symbolism of most advanced cultures there is visible a blending of both, owing to borrowing and to the adoption of foreign ideas. Philosophers like Pythagoras and Heraclitus very early taught the mystic or occult powers of numbers, and this rapidly diverted their significance from their original intent in myth and art. To find what this was we must overlook all such later suggestion and go back, as I have endeavored to do in this paper, to man in his primitive condition and study the laws of his native psychical faculties and his unavoidable and universal physical environment.

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THE ALGONQUIAN TERMS PATAWOMEKE AND MASSAWOMEKE.

BY WILLIAM WALLACE TOOKER.

The significations attributed to many of the early Algonquian names of places or peoples, which have been retained in use from the first planting of the colonies until today, are in most instances totally at variance with the localities or subjects to which the names were originally applied by those who spoke the language. This anomalous state of affairs is due to the fact that the translator endeavored to find an etymology suitable to the present topographical features without trying to discover whether or not the name rightfully belonged there. Some are random conjectures, without a particle of traditional, historical, or etymological foundation; others are based on hypothetical deductions derived from foreign radicals. These last two are as persistent as any, in defiance of their evident false analysis, and will be quoted in historical works and essays until their true etymologies have been given and generally accepted.

Dr. J. Hammond Trumbull* has shown that Indian geographical names (and it will apply to others not geographical) after their adoption by the English, Dutch, and German colonists became unmeaning sounds or mere vocal designations, their primary significations being entirely obliterated by their transfer to an alien tongue. A mountain, for instance, takes the name of a lake; a tract of land, that of a hill; a swamp, the personal name of an Indian residing there; a spring of water, that of a forest; a river, that of a people, or *vice versa*. The Indian language tolerated no such mere marks; every name was descriptive of the spot or subject to which it was applied, and thus to an Indian understanding its identity was beyond question.

Some of these terms in local speech of the whites have for various reasons become abbreviated by the loss of some constituent. These are all problems of the most intricate description,

* Indian Names in Connecticut.

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and their interpretations will always remain in doubt in case the original cluster-word has been lost or forgotten. Therefore it is absolutely essential for the proper resolution of synthesis by analysis of Indian nomenclature that the student should have at his disposal, for the purposes of comparison with various cognate dialects, the earliest utterances of the names as recorded by those who heard them spoken, together with the historical facts relating to the same which have been preserved.

The interest in Indian nomenclature increases every year. The true meanings of the terms are desired by the historian and by every one interested in the various branches of anthropology. The question, therefore, naturally arises, Is it possible by study and research to evolve an etymology from these names which shall be acceptable from every standpoint of comparison? I believe that the greater number of these terms can be translated much easier than the Maya hieroglyphs, or the petrographs of the Algonquian stock. Their translations corroborate the early historians most abundantly; they supply a solution to many unsettled questions and give us more reliable data for historical investigation.

Some of the names mentioned by Captain John Smith have been in constant use since his day, with but slight change in spelling. Nearly all of these belong to the Powhatan language, which was more closely related in its radical structure to that of the Indians of southern New England than to the language of the Delawares, who were geographically nearer. From this fact it can be easily seen that the works of Roger Williams, John Eliot, and Josiah Cotton, together with William Strachey's Virginia Dictionary, afford abundant and reliable means of interpreting the geographical names and tribal designations displayed on Smith's well-known map of Virginia, as well as those incidentally mentioned in his various works. When careful and intelligent comparison of these languages is made it is comparatively easy to find analogies in other dialects of the same stock. This cannot be done, however, without much preliminary study and without the aid of the work already accomplished by many patient Algonquian scholars. If their conclusions are correct, we have a very strong basis for our own deductions; if in error, we must learn where they have failed and endeavor to avoid similar lapses.

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In this essay I propose to give the results of careful inquiry into the etymology of two Virginian names with the same terminations, but a different nominal theme. It is generally accepted and admitted that both of these names, viz., *Patawomekes* and *Massawomekes*, although applied to people of distinct linguistic stock, are undoubtedly of Algonquian derivation, and therefore need no argumentative discussion at the present moment.

Minute and studious scrutiny of Smith's works will fully convince the seeker after truth that the name *Patawomeke* (= *Potomac*) as applied to the river, although so bestowed on Smith's map and retained to this day, did not primarily belong there; neither does it always designate the name of a town, as supposed, but really, in its early orthography and grammatical structure, described the people themselves. The bestowal of the name on the river by Smith, as was the case with other names of rivers in Virginia, was not out of regard for the meaning hidden therein, but because it designated the largest tribal community living on the stream.

The location of their principal settlement or palisaded inclosure, of 1608 and some years after, was identified by Thomas Jefferson and quoted by Bozman,* who says: "This Indian town is said to have been on the spot where the Virginians subsequently laid out a town, which they called New Marlborough, on a peninsula in Stafford county, Virginia, formed by the Potomack river and a large creek called the Potomack creek." There can be no doubt as to the actual location of the village on the spot indicated; but for all our knowledge concerning the discovery of this people and their town we are indebted to Captain John Smith, who learned of their existence at the time he was held as a prisoner among the tribes who were encamped between the James and the Rappahannock. He remarks: "Hee [Powhatan] described also vpon the same Sea, a mighty Nation called *Pocoughtronack* [= *Bocootaw-anauks*, 'the fire nation' (Strachey), located to the northwest from the falls of the James river], a fierce nation that did eate men, and warred with the people of *Moyaoncer* and *Patauomerke*, Nations vpon the toppe of the heade of the Bay."†

* History of Maryland, vol. i, p. 118.

† Arber's Smith, p. 20.

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It is evident, in fact we know, that many of Smith's statements in regard to the *Patawomekes* were not from personal observation, but were derived from letters or from relations by his contemporaries after his return to England. He says (page 52): "The river is inhabited on both sides. . . . Then [comes] *Patawomeke* with 160 able men;" but later (page 348) makes it more than 200, thus showing an increase of 40 men since his first information. This proves that in the number of its available warriors the tribe was the largest, most prominent and powerful on the river. Speaking of Captain Argall's trading with the natives, he says: "With a taste whereof he returned to Iames towne, from whence the Lord De-la-ware sent him to trade in the river of *Patawomecke.*"* Henry Spelman, whom Smith calls one of the best interpreters in the land (once a prisoner among them, and rescued in September, 1610, by Captain Argall on the aforesaid voyage), in his relation of the event speaks of the king of *Patowomeck* as if it were a tribal name, and that he lived a year or more at a town of his called *Paspatanzie.* This may be another name, or the real one, for the town called *Patowomeck.* Spelman further observes: "When Capt: Argall ariued at a toune cald *Nacottawtanke*, but by our english cald *Camocacocke*, wher he understood that ther was an english boy named Harry. He desiringe to here further of me cam up the river which the Kinge of *Patomeck* hearringe sent me to him and I goinge backe agayne brought the kinge to y^e^ shipe."†

This was, no doubt, the first visit of the English traders to the river subsequent to Smith's second voyage of discovery, in 1608. At all events, we have no record of any in the interval. The town called *Nacottawtanke* by Spelman does not seem to have been the *Nacotchtanck* of Smith, for the reason that the latter was higher up the river and at the head of navigation. As the town was known to the English as *Camocacocke*, it was, perhaps, the same one called by Smith *Cecomo comaco* (="sachem's house"). Assuming this to be the case, we can more readily understand why Argall was obliged to go up the river to meet the king, which he could not have done had he been at *Nacotchtanck* (*Anacostia*).

* Arber, op. cit., 172, 503, 511.
† Arber's Smith, pp. ciii, civ.

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My reason for believing that *Paspatanzie* was the real name for the town of the *Patawomekes* is in its translation, which describes the spot where Smith and Jefferson locate the village at the junction of the creek with the larger river, viz., *Pasp-*, "a bursting forth or flowing out;" *otan*, "a town;" *zie* (=Massachusetts: *es-et*) diminutive form of the locative affix "at" or "about" =*Pasp-otan-es-et*, "a town at the mouth of the stream." These extracts, together with my conclusions, are all links in the chain of evidence against the name *Patawomeke* having been a name of the town from the aboriginal point of view.

Among the various meanings ascribed to the name Potomac appear the following: Heckewelder informs us that the form of the name should be *Pedhamok*, meaning "they are coming by water, drawing near in crafts and canoes." This conjecture is very near, but it would much better apply, as will be noticed hereafter, to the *Massawomekes*. The Jesuit Father Jacker* declares that the word indicates "small fishes," and gives the general meaning as "the river full of swarms of small fry, where fishes spawn in shoals." Still another idea advanced is that the term meant "bushy, or brushy river." "River of Swans" is another. Webster's Dictionary, under the stated authority of Schoolcraft, Trumbull, and Ballard, gives it as "the burning pine, resembling a council fire." There may be others which I have overlooked, but here are evidently enough, such as they are, without making further conjectures. It is acknowledged by James Mooney, of the Bureau of Ethnology, who has devoted much study to Smith's works, and also by many students of Indian linguistics, that none of these are etymologically satisfactory or acceptable. I would not venture to suggest another interpretation unless sure of its true analysis.

In Arber's reprint the name occurs about forty times, with at least seven very slight orthographical variations, as *Pataromerkes*, *Patowomeck*, *Patawomeks*, *Patawomekes*, *Patomecks*, *Patowomekes*, *Pattawomekes*. The most common is the fourth variant. The first is, no doubt, a typographical error, while all appear in some instances without the anglicized plural. Taking any of these forms, which are nearly identical, as representing the true utterances of the native pronunciation and placing the accent

*Maryland Hist. Soc. Fund Pub., vol. 7.

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on the penult, where it belongs, viz., *Patowómeke*, we have its true value, as nearly as it could be presented in English notation. Allowing this basis of study, and considering that the name was originally descriptive of the people, as I believe I have satisfactorily demonstrated, I will proceed to give its analysis.

In the first component, *Patow-* or *Pataw-*, we have a root with a characteristic termination or formative, in the inanimate object form, which represents the mitigation of the verbal energy of the simple transitive verb.* This verb is identical with the Powhatan,† *Patow*, "to bring agayne," that is, to continue bringing (something regularly or habitually). Analogous to the Massachusetts (Cotton) *Patau*, (Eliot) *Paudtow;* Narragansett (Williams), *Páutow;* Delaware (Zeisberger), *Peta*, "to bring in;" Cree (Howse), *Péytow*, "he brings it." This verbal, being a common one, can be found, in one form or another, in all Algonquian languages. (Cf. *Pitanoki: apporter le produit de sa chasse. Pitabose: apporter un echantillon de sa chasse.*‡

The second component has two elements, *óm* and *eke*, with the anglicized plural *s* sometimes added to the affix. This was frequently or invariably done by the English when speaking of the natives; therefore does not always appear rightly bestowed when added to a place-name; but in this instance, being a people, when the translation is made it is found to be correctly applied.

In giving the meaning of the penult *óm*, I cannot do better than to quote Dr. Trumbull's correct study of what is no doubt the same verbal, viz:

> The verb of simple motion—that which expressed merely the notion of going—was in the third person singular of the indicative present *ꝏm*, or, as Eliot wrote it (with the pronominal prefix of the third person), *w ꝏm;* in the plural, *ꝏmwog*, "they go." In combination with other words denoting the direction, manner, or agency of going, Eliot writes *-ohham*, and *-hom* for the singular; as *pummohham*, he goes by sea; *nohham* or *nohhom*, he goes by sailing, he sails (*en nohhamun*, "to sail to," Acts xx, 16): *sohham* (=*soh-ꝏm*) he goes forth, &c. For *ꝏmwog*, Roger Williams writes in the Narragansett dialect *homwock*, "they go."§

* Howse: Cree Grammar, p. 36 et seq.; also Eliot's Bible.

† Strachey's Dictionary.

‡ Cuoq: Lexique de l'Algonquine.

§ Mass. Hist. Soc. Proc., 1866, p. 376.

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In the Powhatan dialect the animate plural affix is *-eke* or *-uke*, although these are sometimes varied, corresponding to the *-ick* or *-ock* of the Narragansett, *-og* of the Massachusetts, and *-ek* of the Lenni Lenâpé. Thus we have our name, in accordance with Algonquian synthesis, *Patow-óm-eke*, "to bring again they go and come," "those who travel to bring again;" or, by a free translation, they were "traveling traders or peddlers" (of what?). Graphite or plumbago was highly valued and was an article of commerce among all the natives. Fragments bearing marks of aboriginal use are found in the western mounds, in the eastern shell-heaps, and scattered over the surface of village sites far removed from its original source of supply. Professor F. W. Putnam, in a letter dated June 26, 1882, admitted that its presence in shell-heaps was unknown to him until I called his attention to the fact. An Indian settlement near Sturbridge, Mass., derived its name* *Metewemesick*, "place of black earth," from the occurrence of the article.† The *Patow-óm-ekes* perhaps take their name (applied to them by neighboring Powhatan tribes, being the first to use it, according to Smith, page 20) from being owners of a similar mine and "peddlers" of this mineral, which Smith mistook for antimony. Smith says, and his statements are always to the point:

> The king of *Patawomeke* gaue vs guides to conduct vs vp a little riuer called *Quiough* [Aquia creek], vp which we rode as high as we could. Leauing the boate; with six shot and diuers Salvages, he marched seuen or eight myle before they came to the mine: leading his hostages in a small chaine they were to haue for their paines, being proud so richly to be adorned.
>
> The mine is a great Rocky mountaine like Antimony: wherein they digged a great hole with shells and hatchets: and hard by it, runneth a fayre brooke of Christal-like water, where they wash away the drosse and keepe the remainder, *which they put in little baggs and sell it all ouer the country to paint theire bodyes, faces, or Idols;* which makes them looke like Blackmores dusted over with siluer, With so much as we could carry we returned to our boate, kindly requiting this kinde king and all his kinde people.‡

Their village having been situated where "the river doth di-

*See R. Williams' Key, Narragansett Club edition, p. 207,

†See N. E. Notes and Queries, Newport, R. I., 1890, vol. i, p. 97.

‡Arber's Smith, pp. 418, 424.

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vide it selfe into 3 or 4 convenient branches,"* made it very accessible to the canoes of the Red-men from every direction. The river was a well traveled waterway, had been for years, and continued so for years afterward, for the transportation of all products of both English and savage industry to the tribes north and west, as we have abundant evidence to prove from the perusal of Smith's works and the works of other early writers.

Smith's mine of graphite, the steatite and workshop quarries recently discovered and investigated,† bearing evidences of early labors in the shape of pot-forms, stone tools, and the consequent débris of manufacture, shows that all of these mines furnished material and utensils which were greatly desired by more remote tribes in whose country these minerals were not found. The Indians of the river were—as were in fact all the Algonquian tribes previous to the influx of settlers, who crowded them out of competition—more inclined to the peaceful pursuits of trade, manufacture, and agriculture than were their visitors, the war-like Massawomekes.

The first information Smith had of the Massawomekes—who are now known to have been a people of Iroquoian affinity, probably some of those afterward known as the "Eries," and not related in any way to the Algonquian tribes of Virginia—was during his first voyage of discovery. He tells us that when he entered the river of Kuskaranaoke (Nanticoke river, Maryland) the people there "much extolled a great nation called the *Massawomekes*."‡ This expression, "much extolled," shows that the natives living on this river were friendly and in close relations with this northern tribe, who visited them for the purpose of bartering their furs for the "white beads they made," as the name *Kuskaranaoke* denotes.§ In construing Smith's statement, it will be noticed that I differ wholly from Bozman,|| for he does not think "much extolled" implies alliance.

* *Ibid.*, p. 348.

† W. H. Holmes: Quarry Workshop. Am. Anthropologist, vol. iii, pp. 1–16; Ancient Soapstone Quarry, *ibid.*, vol. iii, pp. 321–330.

‡ Arber's Smith, p. 111.

§ *Ibid.*, pp. 415, 418.

|| History of Maryland, vol. i, p. 112.

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My friend, Dr. A. S. Gatschet, in his essay on the Massawomekes,* says:

> The Patawomekes or Poto'maks coincides in its termination so closely with that of the Massawomekes that we can assume the same origin for both. In the majority of the Algonkin languages a term like *Massa* means "large," "great," and *-ek* is either the locative ending *-ik*, *-k*, *-q*, or more probably the suffix of the anim. plural, *-gi*, *-ki*, occurring, *e. g.*, Shawnee; *ome* is supposed by A. L. Guss, Esq., to mean lake or water.

Dr. Gatschet accepts Heckewelder's translation of Patawomeke, "we have come by water," and gives that of the Massawomekes, "those on a great water." I agree with this noted philologist that the terminations of the two are identical, but differ entirely from his conclusions as to their significations. He may not agree with it at the present moment. The publication of Arber's Smith since he wrote his essay has solved many vexatious problems; therefore our light of the present is better than was his of the past.

It is impossible to evolve the radical *-pe* or *-mp*, "water," which is characteristic in the Powhatan, as well as in all Algonquian languages, from either name. The definition of *-ome* as "lake" or "water" by Mr. Guss is merely a supposition which will not stand the light of critical analysis. The prefix *Massa*, frequently in many dialects of the family, means "great;" but in this instance I cannot believe it has that meaning, for the reason that *maco* or *macha* is the Powhatan equivalent found in *Maco comaco*, a town on the Patuxent river,† and in *Macha comocko*, "house of the town," on the Chickahominy river.‡ Both of these have been translated by Strachey § and by Dr. Trumbull || as "great house." Accordingly, by placing the accent on the penult and hyphenizing the name as in the previous study, we have *Massaw-ómekes* or *Massow-ómekes*, exhibiting Smith's two variants of its main component. This synthesis presents to view something different to be analyzed and proves conclusively to my mind that *Massaw* or *Massow* is the cognate of the Massachusetts (Eliot), *Mush ꝛn* or *Mish ꝛn* (Cotton), *Musshóan;* Montauk (Gardiner),

* Am. Antiquarian, vol. iii, p. 321.
* Smith's Map.
† Smith, p. 538.
‡ Am. Anthropologist, vol. vi, p. 57.
§ Hist. Mag., No. 1, vol. 7, p. 47.

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Mashuèè; Pequot (Stiles), *Meshwe*, "a canoe." In confirmation of this presentation, Strachey's Dictionary has *uppoushun Mushower*, "the shipps go home;" literally, "they go over, the boats do;" also *Massow-uxac*, "a ship;" literally, "boat of the strangers;" *uxac* (= *onnux* (New England), *wunnux* (Montauk), "white men or strangers"), thus making, with its constituents, *Massow-ómeke*, "those who go and come by boat," the parallel of the Narragansett (Williams) *Mish ꝏnhomwock*, "they go and come by water—*i. e.*, by boat." The same name in a variety of forms, but with a localizing affix, occurs in many places throughout New England, applied to necks or points of land where it was convenient for crossing to another place in a boat; in other words, a ferry. Those which are least altered in form are *Mushauwomuk*, the name for Boston, describing the ferry to Charlestown;* *Mishawomet*, a neck of land in Warwick, R. I.;† *Meshomac* or *Mashomuk*, neck on the southern point of Shelter island, N. Y., opposite Sag Harbor, where they formerly crossed in order to go to Montauk or to Three Mile Harbor.‡ The ferry for the past 150 years has been farther to the northwest, between Shelter island and North Haven.

It has been erroneously stated that Smith gave the meaning as "those on a great water." What Smith really did say was this: "Many descriptions and discourses they made vs, of *Atquanachuck*, *Massawomek*, and other people, signifying they inhabit vpon a great water beyond the mountaines."§ Here he applies the term "people" to both of these names; and his "signifying" is evidently used here in the sense "they made known by signs," as applied to *Atquanachuck* = "those beyond or at the end of the mountains," and to the *Massawomeks*, "those that travel by boat." One people being located on the tidewater of Delaware bay or river and the other on the "Great Lakes" shows that Smith's statement "that they inhabit vpon a great water beyond the mountaines" really applied to both people.‖

Smith's valuable and interesting recitals are strongly corroborative of this study, viz: "Seaven boats full of these *Massaw-*

* Mass. Hist. Soc. Proc., 1866, p. 376.
† Parsons' Indian Names in R. I.
‡ See U. S. Coast Survey map.
§ Arber's Smith, p. 423.
‖ See Smith's Map.

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omeks the discouerers encountred at the head of the Bay; . . . they much exceeded them of our parts: and their dexteritie in their small boats made of the barkes of trees sowed with barke, and well luted with gumme, argueth that they are seated vpon some great water"* Again he says: "From thence returning we met 7 Canowes of the *Massowomeks*."† Mosco, an Indian of *Wighcocomaco*,‡ in interpreting one of the *Hassiningas* (=those that live in caves or rock-shelters), whom Smith and companions captured, said: "The *Massawomeks* did dwell vpon a great water, and had many boats, and so many men that they made warre with all the world."§ Captain Henry Spelman relates: "Beinge in the cuntry of the Patomecke the peopel of Masomeck weare brought thether in Canoes which is a kind of Boate they haue made in the forme of an Hoggs trowgh But sumwhat more hollowed in."|| Captain Henry Fleet,¶ in his conference with the *Massawomekes* on the 13th of June, 1632, writes: "Divers were the imaginations that I did conceive about this discovery and understanding that the river was not for shipping where the people were [where the Massawomekes lived] not yet for boats, but for canoes only I found all my neighboring Indians [Anacostias] to be against my design [of visiting the Massawomekes] the Pascatowies having had great slaughter formerly by them to the number of one thousand persons in my time. They coming in their birchen canoes did seek to withstand me from having trade with the other Indians." It will be observed that Smith and Spelman differ in their descriptions of the boats used. The probability is both were right, and that the term did not always designate the same people; for, indeed, all those who happened to come by boat from the north and west would be described alike by the Virginians with whom they came in contact. It is evident that some of the people called the Massawóm-ekes used the bark canoe, while others used the wooden dugout. This can be observed on the great lakes today. Roger Williams informs us that the *Mishoon* was a boat made

* Arber's Smith, p. 72.
† *Ibid.*, p. 349.
‡ *Ibid.*, p. 424.
§ *Ibid.*, p. 428.
|| *Ibid.*, p. cxiv.
¶ Neill's Founders of Maryland, Albany, 1876.

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of a pine, oak, or chestnut tree hollowed out by burning and scraping. The root, which has a formative affix, seems to have been primarily from *mish*, "wood," "stock," or "trunk of a tree," as in the Narragansett *Wompi-mish*, "chestnut tree;" literally, "white-wood;" *Paugáute-mish*, "oak tree;" Massachusetts (Eliot), *Nocti-mish*, "oak tree.' These two latter mean literally "fire-wood." From descriptions by the early writers the dug-out was the only kind of a boat made or used by the Virginians. Strachey gives several other terms for boat from various roots.

This concludes my demonstration, the most remarkable circumstance in connection with which is that the main components are found in Strachey, where they have been overlooked by all who have endeavored to translate the terms. This fact, together with the terminations agreeing so well with their nominal themes, gives us an analysis which seemingly is absolutely unquestionable.

NOTE 1.—*Bocootaw*, "fire" [Strachey]; *-anauk*, "nation" or "people." "Those people whom Powhatan calls the *Bocootawwonauks*, who [he saith] doe likewize melt copper and other mettalls" (Strachey, p. 27). This would seem to identify these people with the *Assistagué-eronnons* of Champlain, which in the Huron tongue means "Fire nation." On Champlain's map of 1632 they are placed south of Lake Erie. Charlevoix (Tome I, p. 447) mentions a tribe under the name of *Mascoutin*, or "Nation of fire," who were then located still farther west (Doc. His. N. Y., vol. 3, p. 23). A mistake made by many scholars has been the endeavor to identify the terminal *-anauk*, of this name, and *-anough* or *anock*, of *Susquesah-anough* (see Amer. Antiquarian, vol. 15, pp. 286–291), with the Delaware *-hanna*, "a river." When this hypothesis is ignored entirely, as it should be, as far as all of the names of Captain John Smith and Wm. Strachey, which have this termination, are concerned, and the interpretation of "nation" or "people" applied, making these elements the cognate of the Massachusetts and Narragansett *añeuck*, "people," it brings truth out of chaos, is not only strongly confirmed by Smith, but makes his history far more satisfactory and interesting. Comparison of the early Virginian names with the modern Delaware alone will cause failure in every instance.

NOTE 2.—*Hassiningas* or *Hassinungas* (= Massachusetts (Eliot) *hassunnegk*, "cave," Gen., 23: 9, 17; *hassunonoggut*, "holes of the rocks," Jer., 16: 16) from *hassun*, "rock;" *wonogk* or *wonoggut*, "den," "cave," or "hole" (Job, 38: 40).

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NEW WORDS IN THE KOOTENAY LANGUAGE.*

BY A. F. CHAMBERLAIN.

Speaking of the Eskimo, Mr. John Murdoch says:

In the Eskimo language there are two methods of providing a name for anything new. One is to form a derivative expressing some characteristic of the object from one of the established "stem-words" of the language by the aid of one or more of the recognized affixes. The other is to adopt the name by which they hear the object called by those strangers through whom they become acquainted with it. Such a thing as inventing a new "stem-word" to express a new idea appears to be entirely opposed to the spirit of the language.†

There are, of course, in some tongues the simple transference of meaning, widening of signification, resurrection of an almost forgotten word, and the like, which may all finally be placed under Mr. Murdoch's first class. In this brief essay the writer discusses the names for "things new" in the Kootenay language of southeastern British Columbia, on the study of which he has been engaged for the last two years.‡

1. Words relating to Religion.

God. The word now used by the Kootenay Indians to express the idea "*God*" is Yä'kasinki'nāwa'skī, or, as it is sometimes also pronounced, yäkä'sinki'nāwa'skī, said by some to signify "*he who made us.*" This name, probably due to missionary influence,

* The Kutenay or Kootenay language is spoken by about 1,000 Indians, of whom 400 live in southeastern British Columbia and the remainder principally in Idaho and Montana. Their aboriginal name should be pronounced Ki·to-na'-χa. The Kutenay have the reputation of being honest and industrious, and never engage in strife with the neighboring whites. They form distinct linguistic stock. The language, which is largely polysynthetic, has been thoroughly studied only by Dr. Franz Boas and Dr. Chamberlain.—A. S. Gatschet.

† American Anthropologist, vol. i, p. 331.

‡ The alphabet here used is the same as that employed by the writer in Report British Assoc. Adv. Sci., 1892.

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seems to contain kin (= *with the hand*), āwas (= *he us*), yä kē (= *the one that, he who?*). But the analysis is somewhat doubtful. Compare, however: g·ā'tlāka'sinnī'tla?= *Whose house is it?* Yā'kāk·ā'kē = *the same as.* In very colloquial language the expression nāsū'kwēn (*chief*) nā'ɛtā (*on high*), modeled after the sā'qalīta'iī of the Chinook jargon, is in use, with which compare the Kāti'tōnā'tlā (*Our Father*) nā'ɛtā (*on high*), the beginning of De Smet's rendering of the Paternoster into Kootenay. In their uncivilized state it is probable that the Coyote and the Chicken-Hawk were the nearest approaches to divinity present to their minds.

Priest, clergyman, missionary. The missionaries of the Roman Catholic church, and hence all others, are termed kä'mk·ōk·ō'kōtl āqkā'tūwū'mtlāɛt, literally *black shirt.* Compare the ma'katē wikonaietc, *the black-robed,* of the Nipissing Algonquians.

Church. The word given by several Indians was tsqāmā'tlnē, properly a verbal expression, meaning *there is talking together; they talk together;* from tsqā'näm (*to talk*), -mātl- (*together*), -nē (verbal suffix).

Mass. Related to the preceding is the word for *mass,* gūwi'tlk·ā tsqāmā'tlētl = *the big talking together;* gūwi'tlk·ā = *big, great.*

Holiday, feast-day. Simply *great day,* gūwi'tlk·ā kīyū'kwīyē't.

Days of the week. Sunday, gōkwē'tcin mēyēt, probably *the one day* (*i. e.,* great day); *Monday* (tlā) ō'kwēn mēyēt = "(*and*) *one day*" (*i. e.,* the day after Sunday), and so on through the week.

Communion. "*I partake of the consecrated bread*" is hō'(wi)tsāktō'kōwā'kiniktci'tlnē.

Crucifix. The word employed by several Indians was k'tcik'mā'tlinqō'nē, a verbal expression, evidently related to gōtstci'kɛmā'tlinwi'tstlāɛt, "*to fold my arms.*"

Rosary. The word in use seems to be k'kā'qō, which is of doubtful etymology.

The French *Jésus Christ* has been metamorphosed to suit the genius of the language into Cī'cētlē or Cī'cēklē, and the "being in heaven, called Cicikle," of the Nootkas, referred to by Dr. Boas,* is doubtless an Indian disguise of the same. With the Kootenay the Virgin Mary is simply Mā'is (*his-mother*) Cī'cēklē.

Heaven. "*Sky,*" in Kootenay, is ā'qkitlmē'yēt, and is used by

*Sixth Rep. on Northwest Tribes of Canada, p. 43.

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Father Coccolo in his rendering of the Paternoster for our "*heaven.*" De Smet, in his version, uses naitte (properly nā'ɛtā. "*on high*"), for "*in heaven.*" In very colloquial language nā'ɛtā ämāk, the equivalent of the Chinook jargon sā'qalī i'lahī, "*sky country,*" is sometimes used.

2. Names of Quadrupeds, the Knowledge of which has come to the Indians through the Whites, or by way of Other Tribes.

Cat. The word pūs comes into Kootenay either directly from the whites or through the Chinook jargon. I have, however, never heard the word reduplicated—pūspūs, as it sometimes is in that lingo. A "*kitten*" is pūs nā'nā (*small*).

Cattle, Cow, etc. The general term for "*cattle*" is k'ā'nūktlū'k·tlē īā'mō, which seems to signify "*variegated horned animals*" (ū'k·tlē = *horn;* īā'mō = *animal*). For *cow* and *bull*, the words tlū'k'pū and ni'tltsik, signifying originally *female buffalo*, *male buffalo*, are used. A *calf* is ā'qkinkō'mātl. A *steer* is k·ā'gūtlā'ts (*castrated*), from k·ā, *no, without*, ā'qkūtlā'ts, *testicles.*

Dog. The word for "*dog,*" qā'ɛtltsin, has a somewhat foreign aspect, as we find in Kalispelm hetltchin, "*dog,*" and in Piskwaŭs hātltchin, "*horse;*" hehetlchin, "*dog.*" See *Horse.*

Hog. The word gy'inūk·tsā'tlā, by which this animal is known, has reference to the nose of the creature, the chief component being ūk·tsātlā = "*nose, nostrils.*" The "*cut-off*" appearance which the nose of the pig presents probably accounts for the name.

Horse. The name k'k'ā'tlāqā'ɛtltsin, as the Lower Kootenay form, g·idlkā'dlāqā'ɛdltsin, more clearly shows, signifies "*elk-dog,*" the word for "*elk*" being in Upper Kootenay g'itlk'ā'tlē, Lower Kootenay g·idlk'ā'dlē.

Mouse. The name ntsōk, ntcūk, is transferred from the "*field-mouse.*"

Mule. The word gū'witlk·ū'āt literally signifies "*big ear,*" from gūwitl (*big*), k·ū'āt (*ear*).

Rat. One name is gūwi'tlk·ā ntsōk, "*big mouse.*"

Sheep. The domestic sheep is called sūyä'pī ni'tlyäp, or, when no ambiguity can arise, simply ni'tlyäp, in the case of the female; gū'witlk·tlē (*i. e.*, "*big horn*"), in the case of the male, names applied originally to the "Big Horn" mountain sheep. Sūyä'pi

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ni'tlyāp signifies "*white man's sheep.*" In like manner the name gī'ānū'kqō, *goat*, properly belonging to the "*mountain-goat.*"

*Camel.** The name k·ānū'k·tlā is of doubtful etymology. Compare ā'qkō'ktlā'nam, "*skin.*"

*Crocodile.** The name k'i'tlkē is of doubtful etymology.

*Elephant.** The name gō'ōk·tsā'tlā may mean "*tail-nose.*" Compare gōō'ktlām ("*tail-head*")= Chinaman.

*Gorilla, monkey.** The name k'tcēkā'tē seems "*the searcher, the one that looks for;*" hō'tcēkā'tē = *I look for.* Compare the appellation of the "*monkey,*" in Otci'pwē, "*louse hunter.*"

*Leopard.** The name kā'ātlkā'Q'mi'tlQā. Compare the word for a species of salmon kāQkā'tlkiskō'Q'mā'tlā, both of which seem to have reference to the "*spotted skin.*"

*Lion.** The name k'tsEmā'k·Ek·ā signifies "*the strong one.*"

*Rhinoceros.** The word kī'ānū'k·tlē has reference to the "*horn*" (ū'k·tlē). See "*Cattle.*"

*Tiger.** The name kā'Qtliqōwā'Et is of doubtful etymology.

*Zebra.** The word gāk'tlēskō'āk has reference to the "*stripes.*" Compare gāktlē'tl k'kō'ktcī, "*candy,*" literally "*variegated (striped) sugar.*"

3. Names of Birds.

Duck. The domestic duck is called kā'nkūsk·ō'ikāk ("*red leg*"), a name originally belonging to the wild mallard.

Hen. The general name for this domestic fowl is gūtskā'kōminū'k'mā'Enām, qualified by the words stō'kwātl (*female*), and kE'skō (*male*) when necessary. The name has reference to the prominent tail (ā'qkinū'k'mā'Enām) of the bird. Other names are gāktlē'tlinū'k'mā'Enām, "*spotted, variegated tail;*" gūtsi'tlinū'k'mā'Enām, probably "*prominent tail.*"

Peacock. The name gū'witlinū'k·ōmā'Enām signifies "*large tail.*"

Turkey. The word gōwi'tlk·ā t'ā'nkūts signifies "*big grouse.*" T'ā'nkūts is the term applied to the "*ruffled grouse.*"

*Buzzard.** The name kā'spāQ'wa'kāk, according to the Indian who gave it, refers to what he called the "*whiskers*" of the bird.

*Dodo.** The name kānmū'qkōn was explained as having refer-

* Words marked with an asterisk were applied to pictures of the creatures in question in a book shown to the Indians by the writer, and a number of them are doubtless extemporaneous.

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ence to the "*beak*" (āqkū'nkāk) or "*nose*" (āqkū'nām; radical is kūn or kōn) of the bird.

Goat-sucker (Caprimulgus vulg.).* The name gō'inū'k·ōmā'ɛnām has reference to the bird's tail.

Rhinoceros Hornbill (Buceros v.).* The name tsānkū'mkak refers to the "*beak*" of the bird. See the word for the "*Dodo.*"

*Lyre-bird.** The name kīsū'kinū'k·ōmā'ɛnām signifies "*it has a good* (sūk) *or beautiful tail.*"

*Ostrich.** The name kūō'kāk is of doubtful etymology. Compare, however, āqkō'ōkā'kɛnām, "*neck.*"

4. Names of Fish.

Whale. The name gūwi'tlk·ā gīā'kqō signifies "*large fish.*"

*Bass.** The name kai is of doubtful etymology.

*Blind-fish.** The name k'ū'mē is that by which the "*sucker*" of British Columbian waters is known.

*Perch.** The name kā'qātli'qtlōp contains the word for "*fin*" (āqktlū'p). See the word for *Leopard.*

*Pike.** The name kīā'qtlākū'nkāk refers to the "*snout*" (*nose, beak*) of the fish. See the word for "*Dodo.*"

5. Crustaceæ, Insects.

*Water Beetle.** The name kāqā'tlinmō'kwā.

*Centipede.** The word tlitlkō'nākē'tlmāk' is related to the term for "*chair,*" kākōnākē'tlmāk, and has reference to the "*arms* (āqkō'nākē'tlmāk') *and legs*" of the creature.

*Lobster.** The name gī'ānā'tlākō'nākētlmā'k is closely related to the word immediately preceding; the word for "*crab,*" "*craw-fish,*" tsū'mīāq is entirely different.

6. Plants, Vegetables, Fruits.

Anemone multifida. The name sūyä'pī ā'qkis, "*white man his arrow* (*cartridge*)" is significant.

Apple. The word gō'tlwā, which is properly applied to the "*hips*" of the "*wild rose*" (*Rosa pisocarpa*) is now used also for "*apricot, peach, pear, tomato,*" and all similar fruits. An "*orange*" is gūwī'tk·ā gōtlwā, "*big rose-hip.*" Curiously enough an "*apple-tree*" is not gōtlwāwōk (*rose-bush*), as might be supposed. but gō'tlwā ā'qkwōkwā'ēs.

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Bean. The word tsä'm'nā is applied to the "*coffee bean*" as well as to the ordinary garden bean. Compare the homonym tsä'm'nā, "*wood tick.*"

Beet. The name ki'tɛnūs kō'ktcik'nāhā'tkā was explained by one Indian as signifying "*root, the color of urine, growing from the earth.*" The chief components, however, seem to be ki'tɛnūs (*cf.* kitɛnū'stik, "*to paint red*"), and k'kō'ktcī, "*sweet.*"

Cabbage. The name kē'kō'ktla'kpē'kā'tl probably signifies "*edible leaf-plant*," from ēk (*eat*), ā'qkōtlākpē'k (*leaf*), -ātl, a suffix frequent in plant names.

Carrot. The name kānō'hōs nits'nā signifies "*white nits'nā.*" What nits'nā signifies is not apparent.

Corn (*Maize*). The name gātstlā'tlmāk is probably the same as gūtstlā'tlmāk, the term applied to the *Lupinus argentatus.* An "*ear*" of corn is called also āqkō'patl, a name which seems originally to have denoted the "*cone*" of the tamarack, etc.

Cucumber. The word gā'kākōmā'qā is of doubtful etymology. Another term for "*cucumber*" is yū'k'nōg·ō'ik·ā, said by the Indians to signify "*plant that grows on the ground wild.*" The same name is given to melons, squashes, etc.

Lettuce. The same word as that for "*cabbage*" (*q. v.*) is used.

Oats. The name k'k'ā'tlāqā'ɛtltsin kī'ēk means "*horse's food.*" The Otci'pwē papā'djikōkō'cimī'djin has the like meaning.

Onion. The name āqk·ō'ātl is the same as that for the *Allium cernuum*, the "*wild onion*" of the plains.

Parsnip. The name kämnū'qtlū ni'tsɛnā, "*white* nitsɛna."

Peach, Pear. The name gō'tlwā signifies literally "*rose-hip.*" See *Apple.*

Peas. The name given to "*peas*" *in or out of the pod*, or "*canned peas*," is āqk nā'nā. This word means also "*shot*," and "*peas*" are named from the resemblance. Aqk nā'nā is a diminutive of āqk, "*cartridge, bullet*" (primitively "*arrow*"). "*Split peas*" are called k'k·ā'nkō quā'tkqā.

Pepper. The name ā'qkōkplū'tlātl invites comparison with ā'qkōktlū'tlātl, *Juniperus communis.*

Plum. For the name gō'tlwā, see *Apple.* Another word for "*plum*" is āqkē''itlmāk'—a term originally applied to the "*choke-cherry*"—fruit of *Prunus demissa.*

Potato. The original significance of the name wā'ɛtā is unknown. The "Hudson's Bay potatoes" or "lady's fingers" are

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termed kämnū'qtlū wā'ɛtā ("*white potatoes*"). The "*eye*" of the potato is ā'qkītlā'tlāqā'nām.

Squash. For the name gyū'k'nō k·ō'īyā'kā, see *Cucumber.*

Sunflower. The word kākā'dlimō'kōwādlī'dlyit was coined on the spot by a Lower Kootenay woman. It invites comparison with nākā'dlimū'k'nādli'dlēk ("*it lightens, lightning*"), the radical of which is seen in āqkā'dlimūkōwā'ɛt, "*light.*"

Turnip. The name āqktlɛ'mātlu'kɛnām is of doubtful etymology.

Wheat. The name ā'qkinkū'tlātl or ā'qkinkō'ātlātl is also of doubtful etymology.

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THE LAWS OF SPAIN IN THEIR APPLICATION TO THE AMERICAN INDIANS.

BY JOHN G. BOURKE, CAPTAIN THIRD CAVALRY, U. S. A.

Probably no portion of American colonial history has been more neglected than that which relates to Spanish domination. It has been represented and believed by many that the unvarying characteristic of Castilian contact with the aborigine was blood-thirsty cruelty and a bigoted oppression, or at best a sublime indifference to the necessities, rights, and aspirations of the conquered. It cannot be denied that for believing all this there have been most excellent grounds since the incoming tide of Spanish civilization bore upon its crest a flotsam and jetsam of brutal, illiterate humanity, which despised every restraint of law and was bound together only by the attraction of a common greed.

But, so far as the enactment of wise laws could bring about such a result, it may be stated broadly that the Spanish Crown, from the very first days of the Discovery, seems to have aimed at the elevation, civilization, and Christianization of its new subjects. How far these laws were made inoperative by the inertness or rascality of minor officials would be a subject scarcely admitting of discussion in this paper, which merely presents the synopsis of each law and leaves untouched any extended criticism upon its efficacy or mode of operation. All nations, our own included, have passed laws which have gradually been allowed to fall into disuse or been openly abrogated.

The code in question has been taken very carefully from an interesting work* which was lent to me by my friend Colonel Jorge Green, special commissioner from Mexico to the Columbian Exposition. A synopsis only of each law is given in English, but it is believed that scholars interested in a more extended study of the subject will find all the assistance needed in the

* "Recopilacion de Leyes de los Reynos de las Indias," published in Madrid, in 1681, by Julian de Páredes, 4 vols., 8°.

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numerous titles, books, and chapters appended, as well as in the name of the particular sovereign enacting the law, which in nearly every case is given.

The Spaniards found themselves confronted by a problem which involved the destruction or the gradual assimilation and amalgamation of large populations, generally sedentary, tenacious of old usages, superstitious to a degree, and suspicious of all strangers.

The Spaniard, to his lasting honor be it said, accepted the alternative of assimilation, and, although he sometimes faltered in his high purpose and was often guilty of cruelty, oppression, and the rankest injustice, yet he has left upon the American continent solid communities of aborigines whose social and moral condition has been most appreciably improved by the introduction of horses, cattle, sheep, goats, hogs, and chickens, the planting of orchards of peaches, oranges, and other fruits, as well as vineyards, and instruction in such new trades as carpentry, saddlery, blacksmithing, and wagon-making, or the improvement of such prehistoric handicrafts as stone-masonry, weaving, basket-making, and pottery.

The keynote of the Spanish regulative system, in this connection, may be found in the last will and testament of Queen Isabella, signed by her at Medina del Campo the day previous to her death, in 1504, and on exhibition among other historical treasures at the monastery of "La Rabida," in the Columbian Exposition at Chicago. It reads thus:

Quando nos fueron concedidas por la Santa Sede Apostolica las Islas, y Tierrafirme de el Mar Océano, descubiertas, y por descubrir, nuestra principal intencion fué al tiempo qae lo suplicamos al Papa Alexandro Sexto de buena memoria, que nos hizo la dicha concession, de procurar, inducir, y traer los Pueblos de ellas, y los convertir à nuestra Santa Fé Catolica, y enviar à las dichas Islas, y Tierrafirme, Prelados, y Religiosos, Clérigos, y otras personas doctas, y temorosos de Dios, para instruìr los vecinos, y moradores de ellas à la Santa Fé Catolica, y los doctrinar y enseñar buenas costumbres, y poner en ello la diligencia debida, segun mas largamente en las letras de la dicha concession se contiene. Suplico al Rey, mi Señor muy afectuosamente, y encargo, y mando á la Princesa mi hija, y al Principe su marido, que assi lo hagan, y cumplan, y que este sea su principal fin, y en ello pongan mucha diligencia, y no consientan, ni dén lugar à que los Indios vecinos, y moradores de las dichas Islas, y Tierrafirme, ganados, y por ganar, reciban agravio alguno en sus personas, y bienes: mas manden,

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que sean bien, y justamente tratados, y si algun agravio han recebido, lo remedien, y provean de manera, que no se exceda cosa alguna lo que por las letras apostolicas de la dicha concession nos es inyungido, y mandado. (Law 1, titulo 10, lib. 6.)

Following is the English translation:

"When we had conceded to us by the holy Apostolic See the islands and the terra firma of the ocean sea, discovered or to be discovered, our principal intention was, at the time, that we besought the said concession from Pope Alexander VI, of good memory, to gather and bring together and prevail upon the people of said islands and main land, and convert them to our holy Catholic faith, and to send to them prelates and religious clerics and other persons learned in the faith and possessed of the fear of God, in order that they might instruct the said inhabitants in the holy Catholic faith and indoctrinate and introduce good customs among them and better modes of life, as has been more fully set forth in the text of said concession; therefore I most affectionately beseech my Lord, the King, and I charge and command the princess, my daughter, and the prince, her husband, that they shall make it their principal object diligently to execute and carry out this my will, and that they neither consent nor allow any of the Indians native of or residing in said isles and main land to receive any harm whatever, either in person or property, but that they command them to be well and justly treated; and if they have received any injury, that they remedy it and so provide that in no manner shall the precepts enjoined and commanded in the apostolic letters of said concession be neglected."

The laws now following are not inserted chronologically, but rather by subjects, although, generally speaking, they begin with the Emperor Charles V, who quotes the terms of the above will as the fundamental principle of all Spanish Indian legislation:

All officials, ecclesiastical as well as military, were enjoined to do all in their power to carry out the purpose of these beneficent laws. Law 1, Emperor Charles V.

The Indians were to be allowed to marry freely. Law 2.

But Indians were not to marry before attaining legitimate age. Law 3.

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Punishment was decreed against Indian men or women who married more than one wife or husband. Law 4.

This provision applied equally to infidel as to Christianized Indians. Law 5.

No Indian could sell his daughter, in matrimony or otherwise. Law 6.

Indians should marry in their own villages, except in the case of widows, who could return to the village of their birth. Law 7.

An Indian woman having children by a Spaniard could change domicile with him. Law 8.

Indians should not be separated from their fathers or relatives. Law 9.

The children of married women should be considered as belonging to the village of the father; those of unmarried women, to the mother's village. Law 10.

Indians should be allowed to have their children brought up in trades and other useful occupations without hindrance from anybody. Law 11.

Indians living in peace should be allowed to go freely from place to place. Law 12.

Indians should not be transported from hot lands to "tierra fria" or the reverse. Law 13.

Indians should not be carried off to Spain. Law 14.

Indians who had been smuggled into Spain should be returned to the New World at the cost of the Crown when the name of the man who had brought them across the sea could not be discovered. Law 15.

Schools for the instruction of the aborigines in the Castilian language should be established in each village without delay. This law was passed by the Emperor Charles V as early as 1550.

The Emperor Charles V, in 1551, established the Universities of Lima and Mexico, whose graduates were to enjoy the same privileges as the graduates of Salamanca (Law 1, libro 1, titulo 22). These universities were established "Para servir á Dios, nuestro Señor, y bien publico de nuestros Reynos conviene que nuestros Vasalles, subditos y naturales tengan en ellos Universidades y estudios generales." Other universities were established at a much later date by Philip IV in the cities of Santo

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Domingo, Santa Fé de Bogota, Santiago de Guatemala, Santiago de Chile, and Manila de Filipinas. *Idem.*

But Charles V had done more than this; he had previously founded, or rather accepted the foundation of, the Franciscan University or College of Tzintzontin, on Lake Patzcuaro, in Michoacan. This college was established prior to 1543, and by 1581, as I have shown in a previous article in the AMERICAN ANTHROPOLOGIST,* had become the great university whose ruins are among the most impressive on our continent. In one of the four churches belonging to this ruined university still hangs one of Titian's masterpieces, "The Entombment of Christ."

Ley XII. "Declaramos, que pertenecen à nuestro Patronazgo Real el Colegio de Españoles, Mestizos è Indios, para que estudien Gramatica, y el Hospital de pobres enfermos de la Ciudad de Mechoacàn de la Nueva España, y aceptamos la cession, que en nuestra Real Corona hizo el Fundador, porque los Estudiantes y pobres sean mas bien favorecidos, y administrados." Charles V, Barcelona, May 1, 1543, in lib. 1, tit. 23.

The Indians were to be free and not slaves. Law 1, libro 6, titulo 2, Charles V, 1526.

"Encomenderos" were prohibited from selling Indians as slaves. Law 2, lib. 6, titulo 2, Charles V, 1541.

Indian caçiques were prohibited from holding their subjects as slaves (Law 3, *idem.*, Charles V, 1538). Several other laws, of the same general purport in regard to the freedom of the Indians, are to be found in the same title. One provides for the pursuit and severe punishment of the Portuguese of Brazil, who had made it a practice to raid the missions of Paraguay in order to carry the Indians into slavery (Law 6, *idem.*, Philip IV, 1628). It was even prohibited to sell Indian captives taken in war, and this prohibition was so strongly worded that it read that no man could sell, barter, transfer, or exchange any such captive, even with the captive's own will. Law 7, lib. 6, tit. 2, Philip III, 1618.

The Spaniards had a dread of the unwholesome influence of half-breeds, squaw-men, and refugees. No Spaniard, unless sick and unable to travel, was permitted to remain in an Indian village more than one full day, not counting the day of arrival or the day of departure. A penalty of fifty dollars in gold was imposed upon each infraction of this law.

* Vol. vi, p. 65, January, 1893.

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No Spaniards, negroes, mulattoes, or mestizoes were permitted to live in Indian pueblos (Law 22, lib. 6, titulo 3, Philip IV, 1646), not even when they had bought land of the Indians.

Ningun Español, que fuere de camino à qualquier parte que sea, sin justa causa no demore, ni esté en los Pueblos de Indios por donde hiciere el viage mas tiempo del dia que llegare, y otro, y al tercero se parta, y salga del Pueblo, pena de que si mas se detuviere, pague por cada dia cincuenta pesos de oro de minas, aplicados por mitad, à nuestra Camara, y Fisco, y la otra al Juez, y Denunciador, por iguales partes. (Law 23, lib. 6, titulo 3, Charles V, at Valladolid, November 20, 1536.)

This law of exclusion is observed to this day in many of the Indian pueblos, particularly among the Yaquis.

Philip III, in 1600, extended the privilege to merchants, so that they could remain three days (Law 24, lib. 6, titulo 3). In visiting a pueblo white men were not allowed to stop at the house of an Indian when "mesones" or places of entertainment had been established. Law 25, lib. 6, titulo 3, Philip II, 1563.

Titulo 5, libro 6, is devoted to the general subject of taxes and tributes to be paid by the Indians. We learn that Indian caçiques and other officials were not to pay taxes of any kind; but, on the other hand, this exemption applied only so long as they abstained from participation in the dances, drinking bouts, feasts, and other ceremonies of the natives.

No half-breed could be a caçique among the Indians. Law 6, lib. 6, titulo 7, Philip II, 1576.

In Titulo 7 of libro 6 are many beneficent laws for the regulation of the internal life of the Indian pueblos. No caçique could hold one of his own people in slavery, draw excessive tribute from them, receive their daughters in vassalage, or kill any of them at the time of the funeral of another caçique. (For the last item, see Law 15.)

Tlascalans were to be treated with special consideration in gratitude for services rendered to the Spaniards under Cortez. Law 39, Philip II.

The Indians of Tlascala were to be permitted to write to the King of Spain direct, without hindrance from the viceroys of Mexico or anybody else. Law 45, Philip II, 1581.

Indians could sell their property holdings under the supervision of the legal authorities. Law 27, Philip II, 1571.

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Indians were to be permitted to hold their own "tianguez" or markets as of yore. Law 28, Charles V, 1552.

Severe penalties were imposed upon those Spaniards who should endeavor, in collusion with the caçiques or others of the Indians, to get up "corners." Law 29, Charles V, 1551.*

Arms were not to be sold to Indians. Law 31, Ferdinand and Isabella, in Grenada, 1502.

Ecclesiastics were forbidden to receive bequests for church purposes from rich Indians when there were natural heirs. Law 32, Philip II, 1580.

Indians were not allowed to ride on horseback (Law 33, Philip II, 1568), but special license might be given by governors, and Indians could also carry official dispatches or use horses in other cases of emergency. Law 34, *ibid.*

Indian dances were to be conducted with decency and moral cleanliness. Law 38, Philip II, 1576.

No liquor was to be sold to Indians. Law 36, Philip II, 1575.

Civil judges alone should try cases of witchcraft among Indians. Law 35, Philip II, 1575.

Indians were to be kept in their own villages as much as might be possible with kindness, so that the ecclesiastics appointed over them might all the more readily become acquainted with them and be able to advance them in Christianity and civilization; the natives were to be told why this law was passed. Law 20, Charles V, 1532.

No work of any kind was to be imposed upon recently subjugated Indians, and no taxes of any kind levied for the space of five years (Law 20, Philip III, 1618). The same law provided that in the meantime every effort should be made to instruct them in useful work.

Indian officials could retain their offices; laborers should cultivate their fields according to their own customs; idleness was

*This Law 29 was interpreted most rigorously and was followed by others of much the same tenor. Indians could sell only in the designated market place, plaza or "tianguez;" they could not go to the house of any civil, military, or ecclesiastical dignitary to dispose of their wares. This was expressly to prevent their being cajoled or intimidated into accepting low prices. Neither could an Indian sell to any person whom he met in the road on his way to market. Strange as it may seem, this law is observed to our own day by the Pueblos of New Mexico and the Indians of Mexico in many places.

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to be discountenanced and prohibited in every way. Law 22, Charles V, 1552.

Indians were to be encouraged to raise live-stock. Law 22, Charles V, 1551.

Free commerce was to be encouraged between Indians and Spaniards. Law 23, Philip III, 1602.

Indians should freely sell their fruits and other productions. Law 25, Charles V, 1551.

Indians should wear clothing. Law 22, *op. cit.*

Special attention was to be paid to Indian trade, to the end that the natives should not be cheated, overcharged in business, or made to pay excessive fines; this duty was imposed upon the viceroy. Law 26, Philip III, 1601.

Indians were not allowed to sell or alienate in any way their property. Law 2, lib. VI, tit. 2, Philip III, 1609.

The Caribs, who were alleged to be cannibals and to be making war upon the tribes of the mainland for the purpose of securing human victims, were exempted from the provisions of these laws. Law 13, lib. VI, tit. 2, Philip II, 1569.

In every "reduccion" or mission of Indians there was to be a chapel in which mass could be said with decency, and this chapel was to be provided with a door which was to be locked with a key (Law of Philip III, 1618). In these chapels there were also to be sacristans, one for each, and two or three "cantores" or singers. Philip III, 1618.

Indians who were employed as servants in houses were to be properly supported, fed, taught the Christian doctrine, and treated when sick. A sick Indian could break a contract when he did not receive proper medical attention, and his master was obliged to pay him all dues, and when the Indian recovered his health the master had no claim upon him for services. Law 22, lib. VI, tit. 13, Philip III, 1618; also Law 23, by the same king.

A church ornament (kind not mentioned), a chalice, with its paten, and a bell were ordered given from the royal treasury to each and every new monastery established in the Indies. Law 5, lib. I, tit. 3, Philip II, August 24, 1588.

At a still later date, but too late for incorporation in this "Recopilacion," laws were passed confirming in perpetuity to each Indian pueblo in New Spain one league of land in each of the four cardinal directions.

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There were other enactments concerning the inheritance of the "repartimientos" and "encomiendas" granted to the early "conquistadores" and their immediate descendants, but these applied less to the aborigines than to the Spaniards.

An explanation of the term "conquistadores," as applied to the early Spanish explorers, must be found in the use of terms in old Spain. We may find that "conquest here means maintaining the struggle or the duty of conquering. While the Moors were still unconquered in the south of Spain, certain parts of their territory were said to belong to the Conquest of Castile, others to the Conquest of Aragon." Alvarez, "Abyssinia," Hakluyt Society, London, 1881, p. 114, foot-note.

I did not find in the "Recopilacion" any laws upon the subject of Indian "peonage." All such laws would seem to have been passed by the Spanish colonies after separation from the mother country or by the viceroys in the decadence of Spanish supremacy.

For these laws, which practically reduced men to slavery for debt, no palliation whatever can be found; but they were by no means peculiar to Spain or to Spanish America. Imprisonment for debt, merely another name for slavery, prevailed in England down to the first years of Victoria's reign and until Charles Dickens assailed the system with his powerful pen. In France less than two centuries ago the brilliant Pascal, in his "Lettres Provinciales," bitterly assailed the Jesuits for advancing the heretical doctrine that insolvency might be innocent or fraudulent, and that to imprison innocent debtors meant destruction to commerce and the state.

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THE BASKET DRUM.

BY DR. WASHINGTON MATTHEWS, U. S. A.

To most observers the object shown in Fig. 1 may seem a simple basket, but it is much more to many an untutored savage. The art of basket-making is today little cultivated among the Navajos. In developing their blanket-making to the highest point of Indian art, the women of this tribe have neglected other labors. The much ruder, but cognate Apaches, who know not how to weave woolen fabrics, make more baskets than the Navajos and make them in greater variety of form, color, and quality. The basket illustrated is, however, of Navajo make, and it is skillfully fabricated, yet it is almost the only form and pattern of basket now made in the tribe. They buy most of their baskets from other tribes; but, having generally let the art of basketry fall into disuse, they still continue to make this form for the reason that it is essential to their sacred rites and must be supplied by women of the tribe who know what is required. It is made of twigs of aromatic sumac—a shrub which has many sacred uses—wound in the form of a helix. The fabricator must always put the butt end of the twig toward the center of the basket and the tip toward the periphery. A band of red and black, with zigzag edges, is the sole decoration. This band is not continuous, but is intersected at one point by a narrow line of uncolored wood. When I first observed this, years ago, I fancied that it had some relation to the "line of life" observed in ancient and modern Pueblo pottery, and that its existence might be explained by reasons as metaphysical as those which the Pueblos give for their "line of life;" but the Navajo has at least one reason of a more practical character. The line is put there to assist in the orientation of the basket at night in the medicine-lodge when the fire has burned low and the light is dim. In an article published in the *American Anthropologist* (October, 1892) I explained the law of butts and tips in Navajo ceremonies and may not now repeat the explanation. It must suffice to say that throughout their ceremonies careful discrimination is made between the butt and the tip, the central and the

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peripheral ends, and that the butt has precedence over the tip. This law applies to the basket in question as well as to other sacred things. The butt of the first twig, placed in the center, and the tip of the last twig, in the edge, must lie in the same radial line, and this line is marked by the hiatus in the ornamental band. The rim of the basket is often so neatly finished that the medicine-man could not easily tell where the helix

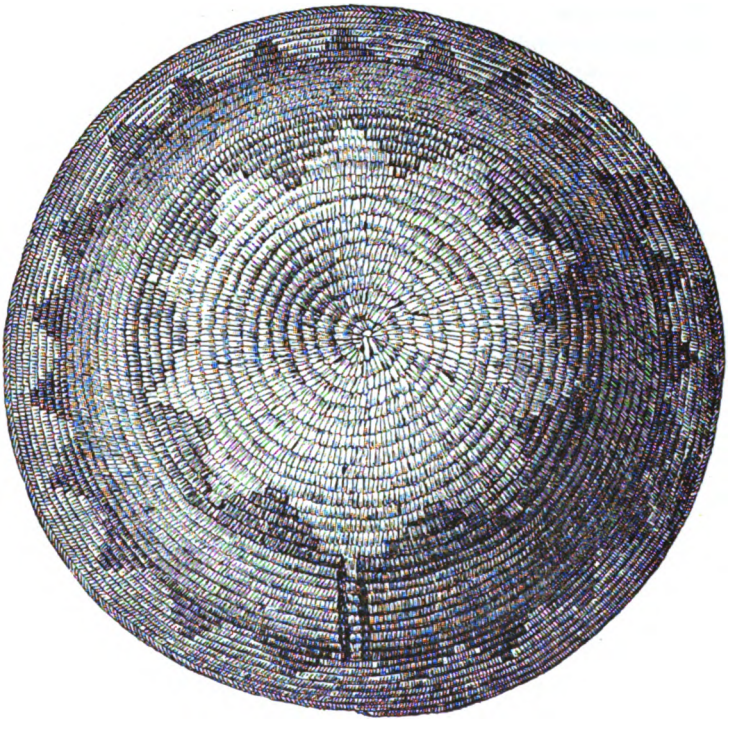


FIG. 1.

ended were not the pale line there to guide him. This line must lie due east and west when the basket is employed in the ceremonies.

The most important use of the basket is as a drum. In none of the ancient Navajo rites is a regular drum or tomtom employed. The inverted basket serves the purpose of one, and the way in which it is used for this simple object is rendered devious

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and difficult by ceremonious observances. To illustrate, let me describe a few of these observances belonging to the ceremony of the night-chant. This ceremony lasts nine nights and nine days. During the first four nights song is accompanied only by the rattle. During the last five nights noises are elicited from the basket-drum by means of the yucca drumstick. This drum is beaten only in the western side of the lodge. For four of these five nights the following methods are pursued: A small Navajo blanket is laid on the ground, its longer dimension extending east and west. An incomplete circle of meal, open in the east, of the diameter of the basket, is traced on the blanket near its eastern end. A cross in meal, its ends touching the circle near the cardinal points, is then described within the circle. In making this cross a line is first drawn from east to west, and then a line is drawn from south to north. Meal is then applied sunwise to the rim of the upturned basket so as to form an incomplete circle with its opening in the east. A cross similar to that on the blanket is drawn in meal on the concavity of the basket, the east-and-west line of which cross must pass directly through the hiatus in the ornamental band. The basket is then inverted on the blanket in such a manner that the figures in meal on the one shall correspond in position to those on the other. The western half of the blanket is then folded over the convexity of the basket and the musicians are ready to begin; but before they begin to beat time to a song they tap the basket with the drumstick at the four cardinal points in the order of east, south, west, and north. The Navajos say, "We turn down the basket" when they refer to the commencement of songs in which the basket-drum is used, and "We turn up the basket" when they refer to the ending of the songs for the night. On the last night the basket is turned down with much the same observances as on the previous nights, but the openings in the ornamental band and in the circles of meal are turned to the west instead of to the east, and the eastern half of the blanket is folded over the concavity of the basket. There are songs for turning up and for turning down the basket, and there are certain words in these songs at which the shaman prepares to turn up the basket by putting his hand under its eastern rim, and other words at which he does the turning. For four nights, when the basket is turned down, the eastern part is laid

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on the outstretched blanket first and it is inverted toward the west. On the fifth night it is inverted in the opposite direction. When it is turned up, it is always lifted first at the eastern edge. As it is raised an imaginary something is blown toward the east, in the direction of the smoke-hole of the lodge, and when it is completely turned up hands are waved in the same direction, to drive out the evil influences which the sacred songs have collected and imprisoned under the basket.

The border of this, as of other Navajo baskets, is finished in a diagonally woven or plaited pattern. These Indians say that the Apaches and other neighboring tribes finish the margins of their baskets with simple circular turns of the investing fibre like that in the rest of the basket. The Navajo basket, they believe, may always be known by the peculiar finish described, and they say that if among other tribes a woman is found who makes the Navajo finish she is of Navajo descent or has learned her art of a Navajo. They account for this by a legend which is perhaps not wholly mythical. In the ancient days a Navajo woman was seated under a juniper tree finishing a basket in the style of the other tribes, as was then the Navajo custom, and while so engaged she was intently thinking if some stronger and more beautiful margin could not be devised. As she thus sat in thought the god Qastceyelçi tore from the overhanging juniper tree a small spray and cast it into her basket. It immediately occurred to her to imitate in her work the peculiar fold of the juniper leaves and she soon devised a way of doing so. If this margin is worn through or torn in any way the basket is unfit for sacred use. The basket is given to the shaman when the rites are done. He must not keep it, but must give it away, and he must be careful never to eat out of it, for, notwithstanding its sacred use, it is no desecration to serve food in it.

The Drumstick.

The next thing to be examined is the drumstick with which this drum is beaten. I shall describe now only the stick used in one rite—that of the night-chant. The task of making this stick does not necessarily belong to the shaman; any assistant may make it; but so intricate are the rules pertaining to its construction that one shaman has told me he never found any one

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who could form it merely from verbal instructions. Practical instructions are necessary. The drumstick is made anew for each ceremony and destroyed, in a manner to be described, when the ceremony is over. It is formed from the stout leaves of *Yucca baccata*, a species of Spanish bayonet, but not every plant of this kind is worthy to furnish the material. I have seen an hour spent in search for the proper plant on a hillside bristling with *Yucca baccata*. Four leaves only can be used, and they must all come from the same plant, one from each of the cardinal points of the stem. All must be of the proper length and absolutely free from wound, stain, withered point, or blemish of any kind. These conditions are not fulfilled on every yucca. The leaves may not be cut off, but must be torn off downward at their articulations. The collector first pulls the selected leaf from the east side of the plant, making a mark with his thumb nail on the east or dorsal side of the leaf near its root, in order that he may know this leaf thereafter. He walks sunwise around the plant to the west side, marks the selected leaf near the tip on its palmar (east) surface, and culls it. He then retreats to the south side of the plant and collects his leaf there, but does not mark it. Lastly, he proceeds sunwise to the north and culls his last leaf, also without marking it. When the leaves are all obtained the sharp, flinty points and the curling marginal cilia are torn off and stuck, points upward, in among the remaining leaves of the plant from which they were culled. The four leaves are then taken to the medicine-lodge to be made up. The leaves from the east and west are used for the center or core of the stick and are left whole. The leaves from the north and south are torn into long shreds and used for the wrapper; but since the shaman cannot adequately explain in words to the devotees who assist him how the stick is made, I shall not attempt the task in this paper. I have learned how to make it, and at some future time may describe the method of making with the aid of illustrations. In Fig. 2, which represents the drumstick, it will be observed that the core of the stick is divided by a suture of yucca-shred into five compartments, one for each night during which the stick is used. Into each of these sections are usually put one or more grains of corn, which, during the five nights that the implement is in use, are supposed to imbibe some sacred properties. When the ceremony is all over

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these grains are divided among the visiting medicine-men, to be ground up and put in their medicine-bags. On the last morning of the ceremony, at dawn, when the last song of sequence has been sung and the basket turned up, this drumstick is pulled to pieces in an order the reverse of that in which it was put together. This work may only be done by the shaman who conducted the rites, and, as he proceeds with his work, he sings the song of the unravelling. As each piece is unwrapped it is straightened out and laid down with its point to the east. The débris which accumulated in the manufacture of the drumstick and which has been carefully laid away for five days is now brought forth and one fascicle is made of all. This is taken out of the lodge by an assistant, carried in an easterly direction, and laid in the forks of a cedar tree (or in the branches of some other large plant, if a cedar tree is not at hand), where it will be safe from the trampling feet of cattle. There it is left until destroyed or scattered by the forces of nature. The man who sacrifices these fragments takes out with him in the hollow of his left hand some corn-meal, which he sprinkles with the same hand on the shreds from butt to tip. He takes out also, in a bag, some pollen, which he sprinkles on them in the same direction with his right hand. As he does this he repeats in a low voice the following prayer or benediction:

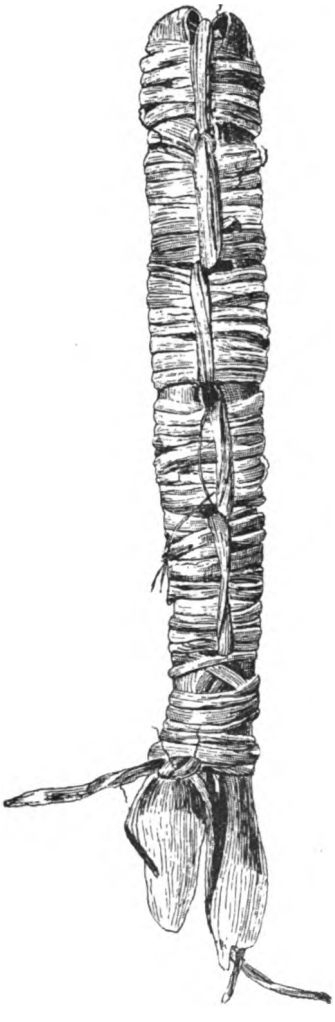


FIG. 2.

Qojolel kòçe.
(Thus will it be beautiful.)
Qojogo nacaco koçe citsoi.
(Thus walk in beauty, my grandchild.)

The drumstick soon loses its freshness and becomes withered, shriveled, and loose. A few taps of one in this condition on the

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basket would knock it all to pieces. Even during the short time that the stick is in use for its sacred purpose it would shrivel and become worthless were it not buried in moist earth all day and taken forth from its hiding place only when needed for the ceremonies of the night.

I have said that the drumstick, when the ceremonies are done, must be pulled apart while a song is sung, and that its fragments must be deposited, with prayer and ceremony, in the fork of a cedar tree or other secure place. How, then, it may be asked, have I come into possession of my drumstick? It was made for my instruction by a shaman, not in the medicine-lodge, but in my own study. Such it is his privilege to do for any recognized student of the rites. I have had several drumsticks made and pulled apart for my instruction, and I have made them myself, under the observation and criticism of the shaman. This one I was allowed to retain intact. No one had ever sung or prayed over it. It had never been used in the rites. It was therefore unnecessary to tear it apart, to release its soul and sacrifice its substance to the gods.

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BOOK NOTICES.

Blackfoot Lodge Tales: The Story of a Prairie People. By George Bird Grinnell, author of "Pawnee Hero Stories and Folk-Tales." New York, Charles Scribner's Sons, 1892, 8°, xv, 310 pp.

Of the half dozen men in this country who know an Indian, the author of this worthy companion to "Pawnee Hero Stories" is one. About these Blackfoot tales there is a memory of tipi smoke and painted buckskin, of rattle and medicine song, that comes only from having sat within the magic circle when the fire burned low, to listen to the old men recount the legends of their tribe, while the dogs barked outside and the coyote answered from the hills. The author has that rare combination of scientific accuracy with attractive literary style which makes all that he writes a reference dictionary to the ethnologist and a pleasure to the folklorist and the popular reader.

The thirty tales of the volume are classified as stories of adventure, of ancient times and of *Old Man*, the hero god of the Blackfeet. They are told as the Indian tells them, without any of the false coloring of the ignorant romancer and without the superfluous toning down sometimes attempted by the commentator of a higher civilization. They show us the Indian as he is and was, not the gloomy hero of Cooper or the incarnate devil of the dime novel and the melodrama, but a primitive man, living close to nature, with all the characteristics of mental childhood. We find him like any other child, whimsical, uncertain, simple and kind-hearted, yet cruel in his revenge and unthinking in his passion, sometimes really heroic in his sense of natural justice, but forever liable to throw all his fine theories to the winds on the caprice of a moment.

A good illustration of this is afforded in the story of the Piegan peace with the Snakes, where, after years of mutual hatred and slaughter, the chiefs of the two tribes meet by accident in a cave at night and come to the generous conclusion to be brothers. They discuss the evils of war and the beauties of peace and fellowship, and decide that hereafter their people shall be

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friends. Each goes home to his own tribe, nearly a whole month's journey from their meeting place, councils are held, speeches are made by the old men, and at last the whole of the two tribes, the Blackfeet from the Saskatchewan and the Snakes from the mountains of Idaho, start simultaneously to the buffalo plains midway to ratify the treaty made by their chiefs. Days and days they travel and finally they come in sight of each other. Then there are greetings and welcomes, buffalo hunts together by day and feasts and dances together at night, and many young men win sweethearts and wives in the camp of their former enemies. At last the hunt is over, the buffalo meat is dried, the tipis are taken down and the *travois* packed, and each tribe starts back for its distant home. The Blackfeet and the Snakes are friends forever. But some young men are racing horses and linger behind for one last trial of speed. Each side claims the victory and the stakes. They quarrel, and before the women and dogs have finally disappeared over the hills the warriors are back again to sink their tomahawks in each other's heads, and "since that time the Snakes and Piegans have never been at peace."

A pretty instance of the sign language occurs in the same story, where the chief of the Snakes, sitting up in the darkness of the cave, takes hold of the hand of the Blackfoot chief, and by waving to and fro (the question sign) asks who he is, to which the other replies by rubbing his hand against the cheek of the Snake (the sign for Piegan). The story of the buffalos that ate human flesh until their nature was changed by *Old Man* is paralleled in the Kiowa myth of Sinti, who in like manner reduced the deer and antelope from dangerous carnivora to timid ruminants. The story of the bad son-in-law who kept all the buffalo hidden under the water and killed one at a time as he wanted it is paralleled in the mythology of many other tribes, notably in the Cherokee myth of Kanati, the owner and lord of the game. Kutoyis, the hero born of a clot of blood and grown to strong manhood in four days, has also his parallel among the Cherokees in the east and the Omahas on the plains.

The chapter on the history and migrations, the social organization and the religion of the Blackfeet, and on their present condition, contains valuable information to be obtained from no other source. It is interesting to note how the possession of

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the horse changed the tribe in a few generations from half-starving hunters in the timber to warlike raiders of the plains. In typography and general make-up the volume accords well with its contents. JAMES MOONEY.

Die Juden und der Antisemitismus: Israel unter den Nationen (The Jews and Antisemitism: Israel among the Nations). By Anatole Leroy-Beaulieu, of the French Institute. Translated into German by Carl von Vincenti. Separate Print from the "Freie Blatt," the organ for combating Anti-Semitism. Authorized Translation. Wien, 1893, 12°, xv, 349 pp.

This work, by the distinguished author of "The Papacy, Socialism and Democracy," is the most important contribution yet given to the world on the subject of the Jewish question in Europe, and in the same connection has much to do with the broader subject of the relation between race and religion. It discusses the Jew from every standpoint, that of ethnology, history, folklore, religion, social rank, education, and physiology, and leaves very little indeed to be added. The broad spirit in which the discussion is handled appears from the first words of the author's preface, in which he tells us that the book is written by a Christian and a Frenchman, by one who believes, as a Christian, that intolerance and racial hatreds are contrary to the spirit of Christianity, and who holds, as a Frenchman, that mankind must be true to the ideals of justice and liberty.

He estimates the Jewish race at from 7 to 9 millions, scattered among from 500 to 600 million Christians and Mohammedans. Although his estimate is necessarily very elastic, it is probably nearer the truth than that of Rabbi Wise, who gives them 20 millions. Of these 7 or 9 millions about one-half are in Russia (chiefly in Russian Poland), 1,700,000 in Austria, 600,000 in Germany, and about 300,000 in Roumania. Italy, France, and England have comparatively few, while in Spain and Portugal, where they once numbered half a million, all native Jews have been long since "baptized or banished." To both Americas he gives perhaps half a million, while in all Asia, the cradle and home of the race, there are barely 300,000. A significant commentary upon the futility of race or religious persecution is the

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fact that the Jews are more numerous now than ever before in their history and are increasing relatively much faster than the Christians. This fertility of oppressed peoples is a well-known paradox in anthropology, notably in the case of the Irish and the southern negro.

The author traces the history of the Jews as an alien people within a hostile nation from the time when Pharaoh took alarm at their numbers and influence and inaugurated the first *Judenhetze*, down through the centuries to the day when Haman stood before the Persian king to complain that there was a certain people scattered abroad through all the provinces of the kingdom whose laws were diverse from those of all other people, so that it was not for the king's profit to suffer them; then, crossing over into Europe, he shows how the old pagan writers of Rome and Greece repeatedly strove to rally the forces of pantheism to resist the spread of the Jewish monotheism, the same old alarm for the "national ideal" about which we hear so much from the German politicians of today, and, finally, when monotheism had won the fight, he shows how the fathers of the early Christian church gave stamp and fixity to the persecution, in order to outlaw the Jew from all community with the newly converted barbarian, who failed to distinguish any essential difference between the God of the gospel and the God of the Pentateuch.

The Jewish problem, in its present aspect, he declares is not a survival or an atavism, but is the outgrowth of modern conditions dating from the emancipation of the Jews by the French revolution. He defines it as threefold, religious, national and social, and asserts that Anti-semitism has studied Darwin and served under Bismarck, and obtains its weapons from the modern theories of civics, science and political economy. He discusses each phase of the question in turn, and shows conclusively that the present Jewish type, with all that that implies of physical, mental and moral characteristics, is the artificial product of fifteen centuries of Ghetto life, together with what may be described as a rigid system of religious hygiene, rather than the natural consequence of purity of blood descent.

He devotes a chapter to the folklore of the Jewish question, in which he recounts the various superstitious beliefs concerning the Jew, which made the child of Abraham an Ishmaelite rather

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than an Israelite. Of special interest are the chapters on the physiology and psychology of the Jew, in which he discusses the physiologic traits and peculiar diseases and the abnormal mental characteristics resulting from hundreds of years of persecution, ostracism, and restriction to specialized occupations in crowded pestilential quarters (ghettos) of large cities. The outcome has been an intense development of intellectual powers, but at the expense of physical stamina. As is usually the case, the danger lies in the very delicacy of the machine. The Jew is the brainiest man in Europe, but he is a bundle of highstrung nerves, and more than all other men he is liable to nervous collapse and insanity.

Although the author makes the pessimistic assertion that the Jewish question is a permanent and growing one, it seems to us that his own book refutes the argument, and that the characteristics which have rendered the Jew a menace and an alien to so many European governments will soften and disappear with the growth of a broader humanity. If despotic Russia and imperial Germany and Austria have a Jewish problem, while republican France and constitutional England have none, we are forced to believe that it is because every country has the Jew that it deserves, and that the true remedy is in the application of the Golden Rule formulated so long ago by the greatest of the Jewish race.

JAMES MOONEY.

Die Medicin der Naturvölker. Ethnologische Beiträge zur Urgeschichte der Medicin. Von Dr. Max Bartels, Sanitätsrath in Berlin. Leipzig: Th. Grieben's Verlag (L. Fernau), 1893, pp. 361; 175 ill., 8vo.

It is seldom one's fortune to find between the covers of a single volume so complete and systematic a treatise of an ethnologic subject as the author has presented in the present work on Medicine among Primitive Peoples. The subject embraces the medico-religious *culture-status* of peoples of diverse countries, presenting the various psycho-physiological theories regarding the cause and cure of disease.

It is generally believed by our North American Indians that diseases are caused by (1) the presence of a demon, located in

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the body through the intermediary of a shaman seeking revenge; (2) the existence of an evil spirit because of neglect on the part of the sufferer of certain duties or observances connected with his personal *manido* or tutelary daimon; (3) the effect of magic or sorcery, produced by jealous rivals, or the *wâbeno;* (4) the direct vengeance of the Great Spirit; and numerous other causes closely related to the preceding.

The subject of *Sickness*, which forms part II of the volume, is thoroughly discussed from every standpoint, and is followed in order by a chapter on *Physicians*—medicine-men, their social status, supernatural pretensions, callings, different kinds of mystery men and women and their specialties, initiation into societies, etc. The *Procedure in Diagnosis of Disease* receives some attention, while *Medicaments and their Application* are fully discussed, as is also the subject of *Primitive Therapeutics. Hydropathic* treatment embraces cold and hot baths, drinks, and vapor baths, the latter being by many peoples one of the most rigidly-adhered-to observances preparatory to undertaking anything of a serious nature.

Diagnosis and Prognosis of diseases are treated of as relating to the calling of the juggler or prophet, while *Treatment of Supernatural Effects* receives considerable attention, as also the *Pathology of the Diseases* of certain organs and parts of the body. The *Prevention of Disease*, followed by *Minor* and *Major Surgery*, conclude the treatise.

The author adds an appendix explanatory of the 175 illustrations, presenting many remarks pertaining thereto that would have been inappropriate in the text. The entire work concludes with a bibliography of the works cited, a list of geographical localities, and peoples referred to.

W. J. Hoffman, M. D.

Wah-kee-nah and her People. The Curious Customs, Traditions, and Legends of the North American Indians. By James C. Strong, U. S. A. New York, 1893. G. P. Putnam's Sons, 275 pp., 1 pl.

The author of this book, in the prosecution of his duties, was thrown among a great many tribes of our aborigines at a time when they were little changed by civilization. The title of the

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book "Wah-kee-nah," is the name of a Yakima girl, a daughter of one of the chiefs, who in 1850–'55 lived in the family of General Strong. Her character and idiosyncrasies are told in a very charming manner; but the especial value of this book to the ethnologist lies in the fact that in all the chapters the author has brought together bits of information concerning the dress, home-life, and industries of many tribes. The reader will find occasion frequently throughout the book to take notes of material which is not accessible elsewhere. O. T. MASON.

NOTES AND NEWS.

L. CAPITAN, in the "*Revue Mensuelle de l'École d'Anthropologie*" *of Paris*, has a study upon the influence of social conditions upon the *morbidité* of individuals. He makes a general classification of maladies: First, of those consequent upon imperfect nutrition; second, of those caused by infection; third, of those due to traumatism; fourth, of those caused by nervous reaction.

Among the innumerable natural causes which may be noted are the climatic, the extremes of heat, of cold, and of humidity, against which the well-to-do are protected by sufficient clothing and the absence of any necessity for personal exposure, while the miserable subject, debilitated by the many privations consequent upon his social condition, is exposed to the rigors and variations of the temperature and is obliged to suffer the direful consequences. Natural causes are also profoundly influenced and modified by those of the social order; the pure air is rendered noxious by impure gases and volatile poisons, to which, in pursuit of their profession or employment, individuals, and frequently whole communities, are subjected. A sewer workman will breathe during his working hours air that Miyuel has shown contains 8,900 microscopic organisms per cubic meter, while that breathed by those upon the Rue de Rivoli does not contain more than 750, and that at the summit of the Pantheon not more than 28 per cubic meter. These examples could be multiplied indefinitely.

Individual causes are classed as intrinsic and extrinsic, the former being essentially comprehended in auto-intoxication and

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auto-infection, the possibility of infection being always present, as our organism carries constantly with it agents capable of infection, microbes, which quickly pass from a passive to an active state.

Extrinsic causes differ absolutely from the intrinsic, and yet it is not unusual to see them associated. Often intrinsic pathogenic influences prepare the way for infection or for extrinsic intoxication. The extrinsic causes of *morbidité* are innumerable. The principal may be grouped as follows: alimentation, hygiene, including the care of the skin; clothing, genital functions, repose, physical work, exercise, intellectual work, etc.

Alimentation constitutes the first chapter of these extrinsic causes and, as is well known, is a powerful factor in producing a series of diverse maladies depending in degree and character upon the character, quality, and quantity of the aliments employed.

Water is a most important and powerful cause of disease, and it is not necessary to demonstrate its rôle in the production of cholera, fevers, etc. It also serves to introduce into the organism various parasites—the *ascaradie lombricoïde*, *oxyures*, the *anchylostome*, etc.

All fermented drinks are poisons. The fatal progression of alcoholism, correlative with the rapid ascension of the curve marking the quantity manufactured and the consumption of alcohol, follows precisely the curve indicating the progress of alcoholic insanity.

From the social point of view, the alcohol consumed by the rich is not the same as that consumed by the poor. It is ordinarily less poisonous, the individual reaction varies, and the visceral alcoholism of the rich is manifested by a symptomatology differing from the alcoholism of the poor.

The far-reaching effects of alcoholism upon the race are terrible, and it often results in the complete disappearance of entire ethnic groups.

Social influences play an important part in causing poisoning by the forced consumption of bad meats.

Milk transports inflectious germs, coming from the animal which furnishes it. It is contaminated by the utensils in which it is placed, by the hands that manipulate it, by the air to which it is exposed, and very frequently by flies.

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Bread is also subject to contamination in various ways—in the preparation and in the cooking, by the use of poisonous utensils, etc.

In short, *morbidité* may result equally from an excessive or an insufficient régime, a fact which renders this study a social question *par excellence.*

The rich ordinarily eat too much and the poor too little. The great eater furnishes a fertile soil in which infection easily germinates, and inversely an insufficient régime contributes to inanition.

THE ORTHOGRAPHY OF SCIENTIFIC LANGUAGE.—M. de Lacaze-Duthiers, president of the French Academy of Sciences, recently opened a séance of that body with a paper upon a subject perhaps a little unexpected, but interesting to very many—"The present orthography of scientific language."

"It is now more than a century," said he, according to *Le Temps*, "since Linnæus proposed his rules, always correct and sensible, which today are too often forgotten. He found that words or terms of too great length become nauseous. This is his expression: 'Nomina generica sesquipedalia, enunciatu difficilia vel nauseosa fugienda sunt,' and Linnæus was right.

"Here is one of these words, and you will excuse me from pronouncing it: Monolasiocallenomonophyllorum.

"What would Linnæus say if he should return in our day and have brought before him to pronounce correctly the modern chemical terms we have here?

"You know that they are seeking to artificially color white flowers. If, then, a part of the audience wishes to have these flowers green, it will be necessary for them to seek a shop for chemical products and demand the acid, diéthyldibenzyldamidotriphénylcar binotrisulfureux, for the purpose of making a solution in which to dip these white flowers. Is it at all necessary to say that this word is of the character of those of which Linnæus said, 'Enunciatu difficilia, nauseosa, fugienda sunt'? Who, then, will say it would not be well (outside of the natural sciences, for which I do not pretend to speak) to follow the principle of Linnæus in making new names a little shorter?

"In conclusion, I declare it here, and it is here that I wish to

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declare it, that I shall be a rebellious recruit in the suppression of the signs characterizing an etymology which cannot be dispensed with. I hold to the retention of phoneticism in the sciences, preserving the orthography and the conventional signs of the etymologies, leaving, then, to live in peace the *ph* and the *y*, the *ch* and the *th*, which render us the greatest service, but leaving also to be eradicated all these peculiarly strange orthographies which have no reason of being and that an inexplicable practice has perpetuated without knowing why.

"In a word, let us preserve a scientific orthography reasonable and useful."

THE TÉRRABA INDIANS.—The Térraba or Tiribi Indians of Costa Rica, Central America, dwell upon the Pacific slope, near the southern border of that country. H. Pittier, who carried on explorations among them in behalf of the territorial government, was brought to believe by their relics that they were a mixture of the various tribes which had been induced to settle in the Diquis valley by the Franciscan missionaries of the eighteenth century. Among them the Terbis or Tervis, who had come from the northern coast, were prominent, and hence the whole assemblage of tribal remnants received the name Terbis or Térrabas. The language of the Térrabas was also adopted by the other portions of the racial conglomerate and, in fact, it is much like the language of the Bribris and other tribes still extant on the Atlantic side of the cordillera.

The Brunka or Bóruka is another cognate people now living three leagues south of the Térrabas. They are of purer origin and are of altogether different appearance. To strangers they communicate words of their vernacular with great reluctance. Dr. William M. Gabb has studied their language extensively and has published a memoir on the whole linguistic group—Guatuso excepted—and Bishop B. A. Thiel has added considerably to our knowledge of it; now H. Pittier is taking up the subject again.

In the preliminaries to his "Ensayo lexicografico sobre la lengua de Térraba" he places the dialects of the Talamanca province in one linguistic family, and to this also pertain the dialects of New Granada eastward to the gulf of Darien, as

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Guaimi, Dorasque, Changuina, Chaliva, Cuna, and others. The Bribri group of Costa Rica embraces the Cabécar, Chirripó, Estrella, Tucurrique, and Térraba, part of which are called after rivers passing through the territory. The Brunka or Bóruka differs sensibly from these and should be classed as a separate language, though of the same family. The pronunciation of all these Indians is indistinct and far from sonorous. A peculiar feature of their language is the use of classifying terms, forming compound words with substantives or adjectives to express shape and form of the objects spoken of. So in Térraba the word kwó, *seed*, when suffixed in the above manner, points to something round, curvilinear, or globular, as in bokuó, *face;* kuguó, *knee;* feringuó, *testicle.* Other classifiers of this description are -kró, -gró for *long* objects, -sho indicating *stuff* or *material* of which objects are made, -uoh forming *collective* nouns. These statements are from Carlos Gagini, "Grammatic sketch of Térraba," which forms part of the "Ensayo." Many of the sensations and mental processes which we attribute to the heart are attributed by the Costaricans to the *liver*, guo, and hence such words as *to think*, *remember*, *forget*, *desire*, *sad*, *joyful* are compounded with the syllable guo. A. S. GATSCHET.

THE USE OF THE BOW AND ARROW IN THE TIMOR GROUP.—Very little is known about the methods of arrow-release in the East Indian archipelago. The little I noticed on this subject during my travels through these regions in 1891, particularly in the Timor group, may be of interest.

The only localities in this group where I saw bow and arrows used are Central Timor (Belo), Adonara, and Flores. The inhabitants of Belo and Adonara practice the same release which I am at a loss to classify with certainty among any of the methods described by Prof. Edward S. Morse. The arrow is grasped between thumb and forefinger of the right hand, while the other three fingers pull the bow-string back. Some Solorese of Adonara, however, left off the little finger after the bow was strung, and the arrow was to be shot. In this latter case it would seem to indicate the secondary release. The forefinger of the bow-hand encloses loosely the arrow so as to hold it against the left

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side of the bow, which is held almost vertical. Whether any extra arrows are held in the bow-hand or shaft-hand, I am not sure.

In the island of Flores, the Sika and Lio tribes, largely of Papua blood, practice the primary release. The bow-hand (left) is held as by the Belonese and Solorese, and so is the arrow, to the left of the bow, vertical. A few extra arrows are kept in the bow-hand.

Bows and arrows in Timor, Adonara, and Flores are of a rather inferior type. The arrow-heads are made of iron, bone, and wood; the arrow-butts are not feathered.

In the parts of Polynesia I visited subsequently the bow and arrow are obsolete, and survive only as playthings for children.

DR. H. TEN KATE.

THE AINU OF SAGHALIN.—Mr. B. Douglas Howard relates his experiences among the Ainu of Saghalin in his recent work, "Life with Trans-Siberian Savages (London, 1893). Says a writer in the *Scottish Geographical Magazine* for November, p. 604:

"Having got on very friendly terms with the governors of the Russian penal settlements in the far East, Mr. Howard found himself an honored guest in the most eastern of all, the island of Saghalin. Here, with the very necessary assistance of the governor, he was able to take up his abode in an Ainu village far from the touch of civilization. The people received him as a guest, installed him as Head Wizard in recognition of his professional skill as a surgeon, and finally elected him Honorary Chief. As such he was initiated into the mysteries of the making of poison for the arrow-heads, and with great difficulty saved himself from the infliction of having his ears bored and his person tattooed as marks of his Ainu adoption. . . . On his return to civilization Mr. Howard determined to continue his studies among the Ainu of Yezo, but found great difficulty in getting there. He finally reached Hakodate, shattered and bruised, having escaped with bare life from double shipwreck in two Japanese sailing vessels. This put an end to his active adventures. The book closes with an interesting comparison of the Ainu inhabitants of Saghalin and Yezo, the chief conclusion being their absolute identity in physique and customs and, apparently at least, to a large extent in language. Drunkenness, the besetting vice of the Ainu of Yezo, is unknown in Saghalin."

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"DER BUDDHISMUS ALS RELIGIONS-PHILOSOPHISCHES SYSTEM" is an erudite inquiry into the origin and essence of the most remarkable of all the oriental religions, based more on speculation and research than on Zoroastrianism and Confucianism, but merged in mysticism during the later centuries of its history. Prof. Dr. Adolf Bastian has gathered in 63 pages (Berlin, 1893) the more important points of a lecture delivered by him in the ceremonial hall of the Ethnologic Museum in Berlin, of which he is the director, and illustrated the whole with three plates of diagrams. The purpose of the lecture is to prove that the metaphysical systems of India took origin independently of occidental philosophic development and yield the most fruitful points of comparison with occidental systems. By a series of parallels Bastian shows that the more noteworthy ideas of our philosophies, ancient and modern, have had their mainspring in Buddhism; also that the spirit of quietism and mysticism prevailing there is antagonistic to the progressive tendencies of our epoch. A. S. GATSCHET.

ABORIGINAL USE OF SINEW.—The aborigines of America put sinew to a very great number of uses for which it is peculiarly adapted by its flexibility, lightness, great strength, and durability, and employ it in a variety of forms and sizes. In the making of clothing for men and horses, in the fabrication of weapons, including clubs, bows, arrows, etc., in the building of lodges, and for domestic and many other purposes its use is universal. For bow-strings and rough sewing the sinew of the buffalo is preferred as being coarser in texture, that of the elk being next in favor for these uses. The sinews of the deer, the antelope, the mountain-sheep, and the mountain-lion are also in high favor, that of the mountain-lion being considered the finest and most durable. The sinew is prepared for use by first removing all adhering flesh with the back of a knife. It is then stretched on a board or lodge pole and left to dry for an hour or so preparatory to the separation of the fibers or threads by twisting in the hands. By the same or similar twisting motion and by pulling the fiber can be extended to a reasonable length. Cords or small ropes are made by twisting many fibers together between two forked sticks fastened in the ground and during

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the process rubbing with thin skins of the elk and deer to soften them. The largest cord I have seen made in this manner was one-fourth of an inch in diameter. To prepare it for sewing the sinew is wet and at the needle end rolled on the knee with the palm of the hand to a fine, hard point like that of a shoemaker's bristle. As suggested, the sinews are made sufficiently fine for use in fixing the guiding feathers and fastening the iron or flint heads of arrows and in the wrapping of clubs, etc. Formerly the awl used in sewing was of bone taken from the leg of the eagle. This has been displaced by the common sailor's needle. The over-stitch is that most commonly employed in aboriginal sewing.

ISHAM G. ALLEN.

CENTRAL AMERICAN VOCABULARIES.—Toward the end of the eighteenth century the King of Spain, Charles III, gave orders to the colonial authorities to collect Indian vocabularies. Twenty-one of these are preserved in a manuscript of the royal archives at Seville, Spain, and when the ambassador Manuel M. Peralta had notified the Geographical Society of Madrid in 1882 that they were then accessible, the government of Costa Rica took occasion to publish a part of the manuscript for the ninth congress of Americanists, to be held in 1892 at San Maria de la Rabida, province of Huelva, in an edition of 200 to 300 copies. The Maya dialects contained in the collection, which is in lexicon octavo, are as follows: Poconchi, Cakchi, Quiché (two vocabularies), Cakchiquel (two vocabularies), Tzutuhil, Pocomán, Pupuluca, Chol, Zotzil, Tzental, Chanabal, Zoque, Mam. Subinha (pages 75–80) agrees with Maya dialects in a few words only. Belonging to other stocks are the Chapaneco (Mexico), Cabecara, Viceyta, Terraba (Costa Rica), and Lean y Mulía, which forms a dialect of the Xicaque of Honduras, and is especially valuable, as so little of that family has been published. The book holds 110 pages of solid text, and its main title is as follows: "*Lenguas indigenas* de Centro-America en el siglo XVIII segun copia del archivo de Indias (en Sevilla), hecha por el Licenciado don Leon Fernandez y publicada por R. F. Guardia y Juan F. Ferraz." San José de Costa Rica. Tipografia nacional, 1892.

A. S. GATSCHET.

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THE CAHITA OR CA-ITA LANGUAGE is spoken in various dialects on the Yaqui river, Mexico, in the states of Sonora and Sinaloa, and belongs to a group of languages spoken in northwestern Mexico, on the Pacific slope, which are affiliated to Nahuatl, and comprises Cora or Nayarit, Tepegua, Opata, and Tarahumara, as well as Pima bajo and Pima alto. All these languages were studied at an early date by Spanish missionaries, and the grammar and vocabulary by the Jesuit Father Juan B. de Velasco is composed in an especially thorough manner. Velasco lived twenty years in Sinaloa and died in 1613. His *Arte de la Lengua Cahita* has just been republished by Eustaquio Buelna at Mexico, at the government printing office, 1891 (inside title, 1890—date of Buelna's introduction, December, 1891), and covers 63 + 264 octavo pages. Buelna has by his editing and additional remarks made the language much more intelligible to us. Cahita has rather abundant ways of deriving words from roots and stems; neither the verb nor the noun is very rich in inflectional form. The vocabulary shows at once the great affinity with Nahuatl (or Aztec). The only texts added to the volume are a catechism, with translation. About 3,600 vocables are mentioned.

A. S. GATSCHET.

SKULL AND CHEST FLATTENING.—The custom of flattening the skull of infants prevails not only on the Pacific coast of North and South America, but extensively in Indonesia, as shown in a recent article in *Internationales Archiv für Ethnographie*, Leyden, 1893, pp. 190–192, "Ueber das Abplatten des Schädels und der Brust in Buool, Nordküste von Selebes," von Baron van Hoëvell. The little girl who was the subject of the process was but a few weeks old when observed by Mr. Bauermann, who bought the cradle with the flattening apparatus. A flat piece of wood is fastened to the upper head-board by strings and on a roll made of a piece of the sago leaf (*gaba-gaba*), which goes across the cradle below the infant's neck. The chest is also compressed for the purpose of flattening. A square wooden plate sewed in sago-fiber cloth lies upon the chest and is fastened on both sides to the cradle, which is a trough made of split bamboo. The child's arms are tied down and the spaces between the child and the sides of the cradle are filled with long narrow pillows. This

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treatment begins a week after birth and is continued for at least six months. Neither health nor life are often endangered by this practice, which is common to the neighboring villages of Buool. A supplement to the article gives historical references to the same custom as found in various parts of the globe. Compression of the waist and body for the sake of beauty are frequent, but flattening of the chest in the above manner is perhaps unique.

A. S. GATSCHET.

THE AMERICAN FOLK-LORE SOCIETY is about to undertake an extensive scheme of publication, under the name of "Memoirs of the American Folk-Lore Society." The first volume of this series, to be published in March, will be "Folk-Tales of Angola," by Heli Chatelain, late United States commercial agent in Loanda, West Africa. The work, which, together with an explanatory introduction, will give in original text and literal translation the oral literature of the West African coast, will be the first published representation of the ideas, emotions, and moral sentiments of races from which has been derived a great part of the negro population of the Southern States, and will therefore have an important bearing on American history. Among other works intended to continue the series are collections of the French Creole tales of Louisiana, and of the current superstitions still found in great mass among the English-speaking population.

W. W. NEWELL.

HAWAIIAN FEAST.—As a reminiscence of olden times, the custom of the Hawaiian feast called *luau* is still kept up by the natives. These banquets, to which even foreigners are admitted, are given on every festive occasion. In some shady spot mats are spread, on which the company seat themselves, and aromatic leaves laid down between them serve for table-cloths. The *poi* is contained in wooden vessels, various preparations of meat are rolled in leaves, and, as great delicacies, crabs and other raw fish are produced. A sea grass called *limu* is considered a choice dish. For drink water is used, or, by the less temperate, *awa*, that intoxicating beverage of the Polynesians, which is prepared by fermentation from the root of the *awa* plant and has a strong narcotic effect.—*Marcuse in Scottish Geog. Mag., 1894, pp. 12, 13.*

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THE BRINTON LECTURES.—Dr. Daniel G. Brinton delivered a course of six lectures on general archeology before the Academy of Natural Sciences of Philadelphia between January 29th and March 5th. The titles of the individual lectures were: The aims and methods of archeology, Africa in the semi-historic and prehistoric periods, Asia in the semi-historic and prehistoric periods, Europe in the semi-historic and prehistoric periods, and the Island World in the semi-historic and prehistoric periods.

"CAMPHOR LANGUAGE" IN MALAY.—The camphor tree (*Dryobalanops camphora*) grows abundantly in certain parts of the peninsula, but only occasionally contains camphor crystals. Now, the camphor in question is not at all similar to that obtained from the camphor laurel; it is known in commerce as Borneo camphor, or Borneol, and is in great demand by the Chinese, who use it in embalming their dead, as an incense, and in medicine. Being rare, it always commands a high price. As it by no means follows that each camphor tree contains this valuable product—in fact, it being rather the exception than the rule—recourse must be had to the species of witchcraft known as "Patang Kapor." Therefore, to insure good luck, the hunters while on their expedition must speak the camphor language and observe certain practices in order to propitiate the spirit of the camphor tree, which is known by the Jackun name of *Bisan* (lit., a woman). Her resting-place is near the trees, and at night when a peculiar noise, much resembling that of a variety of cicada, is heard in the forests, the Bisan is abroad, and camphor will surely be found in the neighborhood. The language of the camphor spirit consists of a mixture of Jakun and Malay words, with a large proportion of words of Malay origin, but curiously altered or reversed.—*Lake in The Geographical Journal, London, April*, 1894, *p.* 286.

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THE
AMERICAN ANTHROPOLOGIST
VOL. VII. WASHINGTON, D. C., JULY, 1894. No. 3.

THE BOOK OF THE DEAD AND RAIN CEREMONIALS.

BY ELLEN RUSSELL EMERSON.

I.

Among the Egyptians, as among our red races, supernatural power was sought through talismanic formula; pictures were imbued with magic influences, while the language of the ritual, written in hieroglyphics, contained a psychic force like that which the Indian priest attributed to his mnemonics, for the figures used, whether pictographic or hieroglyphic, were a living expression, the significance of which was vital to the well-being of man.

This belief culminated, as was natural, into an apotheosis of the divine *litteræ humaniores*, and there is found in the Egyptian pantheon a god of letters—a *Logos*, if it may be so termed—whose power is comparable to Osiris, the Lord of the Dead; and this god, *Thoth*, is also the God of Truth.

In that famous scene representing the judgment of the soul, in the Book of the Dead, Thoth is represented in the act of writing the sentence that seals the fate of the deceased, in which office he is both a god of letters and the Lord of Truth; these attributes are indicated by a writing tablet and the feather, that badge of truth ascribed to him as to all gods of light in the Egyptian pantheon.

This association of "truth," letters, and light in the attributes of one personality* provides a suggestion as to what the Egyptian

*See Hymn to Amen-Ra (translation of C. W. Goodwin), in which appear united in one personality the attributes of light and truth; also the principle of life.

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priest meant when ascribing talismanic power to inscriptions. The hieroglyphic writing is truth, and truth is life; but care should be taken not to ascribe a too modern meaning to ancient ideas of "truth," for it is doubtful if the talismanic force in the letters—that is, the "truth" therein set forth—was conceived as purely an intellectual force. On the contrary, physics and psychics were not then divorced. These two contents of the letter were in essence the same; and life was light, as also it was truth. The Egyptian prayed that light should radiate upon his mummy, that he might live. The power of visible things, the force in the letter, were not discriminated from the objects themselves, and therefore the rigorous adherence to the formula, as in more primitive rites:

"Have I told the truth to my son?"
(Nawaⁿ ni-ma-na ninguis?)

inquires the Ojibwa Midē* in his initiatory chant, a strict adherence to the traditional formula of the ceremonial over which he presides being exercised at all points, for each is weighted with the issues of life. All remedial effect thus depending upon the right methods used—that is, the appropriate mnemonic and special rite at each juncture of the performance—the ceremonial became a vital organism, whose functions were interdependent and in whose least part existed a necessary particle of magical force—the force of life. In the Egyptian judgment of the soul the heart is put in the divine scales and weighed with "truth;" and—

"I am using my heart"
(Na min de he ya-ya-nē)

chants the Midē woman, and the Midē man takes up the same refrain:

"In my heart, in my heart
I have the spirit."
(Nin-dai'-a nin-dai'-a ha!)
(We kima' ha wa-no-kwe!)

The heart was believed to be the seat of life, but also of the moral sense, and, as has been said of the Egyptian, the Indian did not discriminate between the two, the physical functions of

*See the Midēwiwin of the Ojibwas. W. J. Hoffman: Report of the Bureau of Ethnology, 1885–'6.

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life and the "spirit" dwelling therein, psychical and physical phenomena not being concomitant, but fundamentally one, a view of existence which to some ways of thinking degrades the "spirit" and in another aspect sublimates the physical functions of which the "spirit" is essentially part. This psychic force in the heart—that is, according to the Indian, the "life"—was not in its nature different from that permeating the pictograph. It is therefore readily understood how necessary was an exactness to formula, and it is no occasion of wonder that the Egyptian, through his belief in the talismanic power of the hieroglyphic, placed on the same moral basis a good or well ordered life and a rigid adherence to religious rites, the performance of which was as necessary in order to become divinized, an Osiriana, as is right living.

"There is no fault in him;
No informer rises up against him.
He liveth the truth;
He doth nourish himself with truth.
The gods are satisfied with all that he hath done.
He hath given food to the hungry, drink to the thirsty,
Clothes to the naked;
He hath given the sacred food to the gods."*

So chants the Egyptian, declaring the justification of the dead, but all of which does not accomplish beatification, for it is added, "When this book has been made for him, then he breathes with the souls of the gods forever and forever. It is finished;" and the sacred book, with its talismanic text, is laid upon the dead body in the region of the heart, in which act may again be noted the significance placed upon the heart in Egyptian offices of the dead. It was the heart that was weighed with truth in the judgment scene, and here the "book" is laid upon the region of the heart. The barbaric Indian priest chants, "I am using my heart," signifying that he is acting uprightly, the "spirit" being "in his heart," thus establishing a primitive precedence to the Egyptian idea and illustrating, what is so often met with among primitive peoples, the recognition that if the heart is true the man's life is "justified," to use an Egyptian term, an idea of great ethical interest. This parallel, discover-

*Book of Breaths of Life." See M. J. Horrack's translation; also De Brugsch, transc. hiero., &c., Berlin Museum.

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able in Egyptian ideas and those of the Ojibwa Indian, invites attention to the rites in which these ideas are expressed.

The "Book of the Dead," represented on various monuments and papyri. is a series of representations of what happens to the deceased in his passage in the under world from west to east—that is, from death to immortal birth. The means by which the scenes of this journey are portrayed are not unlike those used in other and more primitive forms of representation, such as, for instance, those seen in Mexican codices, where vignette is intended to explain the hieroglyphic. They are, however, more graphic, and the figures have conventionalized into a shape which lends a harmony to the lines, so becoming much more pleasing to the eye. This pleasing feature, however, does not conceal the fact that there were many objects, animate or inanimate, held sacred which were used in primitive ceremonials. For instance, it is evident that the mask which our Indian used as representative of his deities was in high favor in Egypt, the deities being identified by their masks; nor did the Egyptian use the human mask, but, like more primitive peoples, he represented his gods in the disguise of animals' heads, and as among barbarians he not only represents the head, but the whole figure is portrayed, and birds and beasts have part in the most sacred drama of all Egyptian ceremonials. It is true an anthropomorphic tendency is shown, as the gods are most frequently human-divine, their heads being that of beasts and their bodies of men, and often this sameness of personal or human shape has the effect of a monotheistic foreshadowing which a similarity of badges suggests; but a sameness of badges or the human shape is not a usage forward of the barbaric stage of development. For instance, as regards the badge of the feather, the most important of all insignia in Egyptian rite, since it typifies both light and truth,—this badge is equally used in solemn rites among the Pueblo Indians, while their deities are represented in the human shape, and it must be observed that a sameness of badge and the "human form divine" does not exempt these Indians from the charge of polytheism; nor does the concept of the Indian represented by the feather fall far short of that of the Egyptian, for it is used in rites of worship of the sun; and the name given to the downy breast feather of the eagle, the "breath feather," which is one of the principal emblems of the

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Tusayan Indians,* suggests its association with life, since they call the soul the "breath body."

This breath feather is a prayer offering, and when the devotee makes his morning orisons he lays it in the way of the coming light as an appeal for the blessing of the God of Day. It therefore is as clearly associated with light as is the Egyptian plume. In one case the devotee selects the eagle-down feather and in the other the ostrich plume, it is true, but both are emblems of the gods of light.

Both Indian and Egyptian use the same symbolic expression to represent the life-giving forces of light. Seeking the most etherial and delicate object, each resorts to the feather, which vibrates at a touch of the wind or with the lightest breath, so appearing tremulous with life, and as if to confirm the parallel we read in Egyptian text:

"The soul of Ra giveth life to thy soul.
The soul of Shou filleth thy respiratory organs with soft breath."†

In which the God of the Sun and the God of Light, to each of whom the badge of the ostrich plume is given, are both mentioned—the one as giver of life; the other of breath.

II.

Much as has been said of the wonderful mastery of the building art among the Egyptians, as testified by its earliest monuments, there is an initial form which marks an evolution in architecture, for the column of the earlier period was a plain shaft with painted devices decorating its surfaces, and this was afterward superseded by more ornate designs in the polygonal or round, while a generous sculpture took the place of the painted device. This fact, discoverable in building art, is presented in the representations of the Book of the Dead. It has been remarked that the column of the ornate period might be properly called a post; this being formed by tying together several stalks of the papyrus plant, of which the opened buds made the capital.

The title thus used is happily chosen, for the early form was doubtless simply a post and not a pillar, as appears from the

*See Journal Am. Eth. and Arch.; Dr. Fewkes, editor.
†Book of Breaths of Life: M. Horrack's translations.

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pictures on various monuments. On the famous alabaster sarcophagus of Oimeneptah,* among the representations of the rites of the dead are portrayed the ancient forms of this post, which is a plain shaft rising to the height of the doors of entrance to Amenti, that under world whither departs the setting sun. To pass these entrances it was necessary for the dead to pass this post, as it stood before the doors intercepting the passage.

These posts are represented with a human mask before one entrance, and in another picture the head is that of the god Anubis, who is sometimes called Guide of the Way, from his office of leading the deceased into the presence of Osiris, Judge of the Dead, as also his general supervision of the mummy on the path of the dead. That these posts were of some especial importance in the rites of the dead may be inferred by their reappearance in the scenes of the ceremonial in one of the last acts, where they appear to have fallen from line, their mask-capped summits sweeping forward over the actors, accentuating by this movement their import in the drama going forward.

The post is an important feature in Indian ceremonial.† The Sioux had a custom of striking the post in their dances, especially in the sun dance, and there was then an obligation to speak the truth;‡ the Indian, in this primitive manner, appearing to enforce the Egyptian's apostrophe of the God of the Sun as "he who speaks true;" "living on truth;" "Hail to thee, Ra, Lord of Truth." The post of the Eskimo is remarkable in being a history, through carving and painting, of the owner's pedigree, which proves his descent from the gods. The post is also a prayer ensign, calling on the sky gods to give life to the living or to the dead, as their occasion of erection may determine.

But it is among the Ojibwa Indians that its purport becomes of especial interest, for it is used as a sign of initiation to the Midē-wegan lodges. These lodges are noticeable by their form of construction, for they are rectangular in shape, and the series

* Fragments in the British Museum. See illustrations by J. Bonomi; S. Sharpe, descrip. Oimeneptah was father of Rameses the Great. Period, 1175 B. C.

† See the five posts in construction of the kibva altar, represented by Dr. Fewkes, editor Jour. Am. Eth. and Arch., vol. ii, p. 95.

‡ Captain Bourke, on the Medicine Men of the Apaches: Report of the Bureau of Ethnology, 1887–'88.

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of spaces, four in number, are ranged east and west so as to open one into the other, very much after the plan of the religious architecture of Egypt, which presents a series of quadrangles opening into each other and in which the columns appear to have some reference to the rising disk of the sun. It is the living sun which shines through the colonnade of the Egyptian temple, and it is "the dead" sun that passes "the posts" in the under world, while with the sun is the mummy which is in "the way" of revivification. The column of the upper world is figured as that sacred plant of the Nile, the lotus, in whose germinating blossom the god Shou is sometimes represented as having his birth. Thus by the association of the God of Light and the plant the relation between the column and the sun seems to be implied.

In the Indian "lodges" the four spaces are typified severally by the posts erected, their number and decoration being sign of degrees of initiation—milestones, as it were, marking the journey on the path of life. The first lodge has but one post, on which is fixed a stuffed owl; the second has two, the third three, and the fourth four posts. The post surmounted by the owl is retained throughout, and symbolic colors embellish the increased numbers, while the addition of a human figure on one and a lateral bar on another, thereby simulating a Latin cross, identify the posts of the advanced degrees, implying changes in the condition of the initiate. These posts are set east and west, and thus are supposed to receive the first life-giving beam of the rising sun.

One who has been so fortunate as to be initiated into the fourth lodge is believed to have acquired divine honors. The Midēwiwin records also designate a path that, having begun at the first entrance-way, leads to the "land of the setting sun," so showing that the path of life is directed by the sun—a notion reiterated in Egyptian hymns with great poetic beauty of expression.

It has been remarked that in the Egyptian representation of the rites of the dead there is an act in which the posts lean over the actors; this act is performed in the fourth scene. The same occurs in the fourth lodge of the Midēwiwin, where the two posts, upright in the foregoing lodges, are represented leaning over the Indian actors.

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In observing these parallels it should not be overlooked that the figures used to designate the degree post—that is, the owl and the cross—are conspicuous in the hieroglyphic writing of Egypt; and a glance at the sarcophagus of Oimeneptah will show not only numerous hieroglyphic figures of the owl as part of the text, but also the peculiar Latin form of the cross in the Midē-degree post, may be seen accompanying the bird, as also the same species of bird is noticeable beside a simple, upright shaft—a self-supporting post.

The appearance of the owl in these associations leads to the conclusion that it had some early importance in primitive Egyptian rites, for the talismanic force in Egyptian writing doubtless accrued through the symbolic meaning of the special objects represented by the hieroglyphics used in that writing.

The owl, it may be remembered, has been found embalmed in the Necropolis at Thebes, so implying its sacred character in Egyptian mythology. It is properly a bird of the night, of mystery and darkness, and its appearance in the description of the revivification of the dead is in accordance with primitive superstitions.

"The Apache Indians," remarks Captain Bourke,* "believe that the dead remain a few days or nights in the neighborhood of the place they departed from life, and that they try to communicate with their living friends through the voice of an owl. If a relative hears this sound by night or, as often happens, he imagines he has seen the ghost itself, he hurries to the nearest medicine man, when he relates his story and a feast is instituted."

It is occasion of speculation why the Midē priest has made this quite universally ominous bird of night a conspicuous emblem in the four rites of the Midēwiwin, since those rites are representative of the path of life. That he has associated the bird with the dead is manifest from the fact that he has represented it traversing the path of the dead, which also is figured in one of the charts given by Dr. Hoffman. But what is there in common on both paths, the living and the dead, that should lead to this sameness of emblem?

It is often found that the conception of the living soul among primitive peoples is that of the human shadow cast by the

* Medicine Men of the Apache.

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sun. This "shade" is that which departs with the setting sun. The Ojibwa priest calls the land of the dead Shadow-land. The Shadow-land is the land of the setting sun, whither flee all the "shades" of the living—and the owl, does it not inhabit the dark, a living manes of the night?

It is of interest to note the fact that the Indian, in what has been termed a barbaric state, has conceived of and pictographically represented with much clearness of design "a way" or path of life, as also of death. This representation is unique among the Indians of the north, for although similar concepts, more or less vague, are found among many northern tribes, the Midē-wiwin lodges are original and peculiar to the Ojibwa.

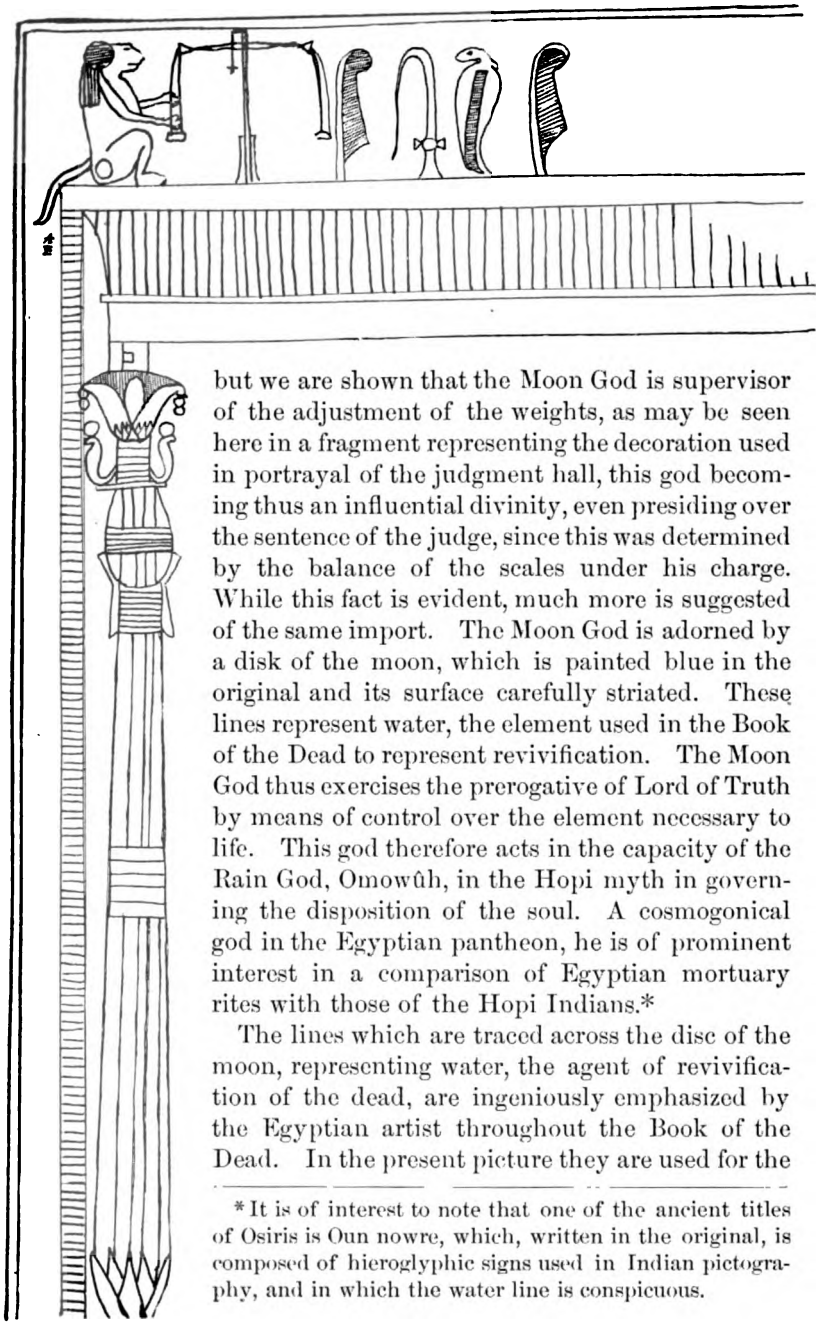
It appears, however, that certain Pueblo Indians have an idea of a path which is pursued by the dead, this path being in the under world, as is the Egyptian "way," which is termed the "right path." "Apheru openeth thee the right way," we read in an address to the deceased; also in the litany of Ra, that deity (the solar god) is apostrophized as "he who opens the pathways of the sarcophagus," so referring to the guidance and revivification of the dead.

It is of especial interest, in comparing these ideas in relation to the path of the dead located in the under world by the Pueblo Indians with the Egyptian, that in each is discovered a belief in a judge who appears at some juncture to judge the dead. Beside this remarkable similarity, certain purgatorial fires are described by both these Indians and Egyptians in the "way" which suggests a germinal idea of later religious development. Purification, it is claimed, may be accomplished in these fiery baths. However, there seems to be a condition, according to the Pueblo Indian, as among the Egyptian, when purification is impossible, and the dead are represented destroyed, a series of fire-baths discovering the unworthiness of the soul.*

The Indian description of judgment in Hades is vague in comparison with the scenes on Egyptian monuments and papyri, for the scales of justice are figured in a most realistic manner, with various accessories, all lending reality to the scene; and we are not only reminded that Osiris is ruler of the under world,

*Mortuary customs among the Hopi Indians: Dr. Fewkes and Mr. Stephen.

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but we are shown that the Moon God is supervisor of the adjustment of the weights, as may be seen here in a fragment representing the decoration used in portrayal of the judgment hall, this god becoming thus an influential divinity, even presiding over the sentence of the judge, since this was determined by the balance of the scales under his charge. While this fact is evident, much more is suggested of the same import. The Moon God is adorned by a disk of the moon, which is painted blue in the original and its surface carefully striated. These lines represent water, the element used in the Book of the Dead to represent revivification. The Moon God thus exercises the prerogative of Lord of Truth by means of control over the element necessary to life. This god therefore acts in the capacity of the Rain God, Omowûh, in the Hopi myth in governing the disposition of the soul. A cosmogonical god in the Egyptian pantheon, he is of prominent interest in a comparison of Egyptian mortuary rites with those of the Hopi Indians.*

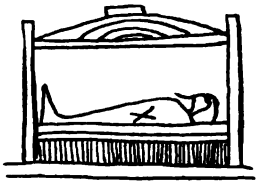
The lines which are traced across the disc of the moon, representing water, the agent of revivification of the dead, are ingeniously emphasized by the Egyptian artist throughout the Book of the Dead. In the present picture they are used for the

* It is of interest to note that one of the ancient titles of Osiris is Oun nowre, which, written in the original, is composed of hieroglyphic signs used in Indian pictography, and in which the water line is conspicuous.

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frieze and upon the petals of the lotus capital and at the side of the column—in fact, they are the principal adornment of the judgment hall, as would be natural in a religious structure among a people who believed in the resurrection of the dead through the same fertilizing power as that which regenerates the plant world,

This line is sometimes straight, as often represented by the Tusayan Indian when associated with cloud and stepped figure, or it is serpentine and crinkling, as when used in mnemonics by the Ojibwa Indians, in which latter case it is particularly identified with the goddess Amenti, in whose extended palms it may be seen crinkling and live like a snake; and so thus the goddess of the under world becomes identified with all gods of humidity and fertilization. These lines, applied in representations of the drama enacted in the under world, may be seen everywhere on Egyptian monuments and tombs, shrines, catafalques, boats, and emblems are embellished with the magic symbol.



Sculpture channels out a frieze to represent the sacred element, and painting, more facile, pictures its blue ripple, while in no place does it ever cease to remind us of the primitive rain sign.

III.

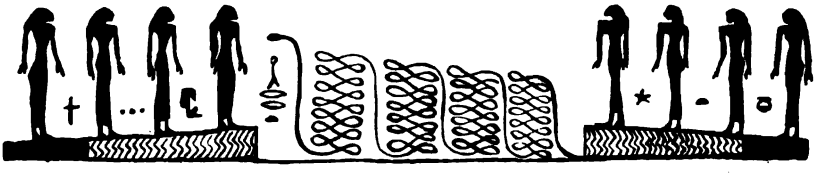
But the Egyptian post, surmounted by a mask of the god Anubis, guide in the way identified as of parallel purport to the degree post used in the ceremonial of initiation to the Midē-wiwin Society, whose rites are claimed to explain "the right path," is not the only figure suggestive of Midē symbols in the Egyptian rites of revivification of the dead; for near these posts, placed before the entrances of the under world, are successively placed two serpents—one a "good" serpent; the other a *cobra di capello*, described as "he who breathes fire." These serpents are guardians of the doorways, acting thus in the capacity of the guardian snakes represented before the Midē lodges in the Ojibwa records.* Nor is this the only feature of parallelism

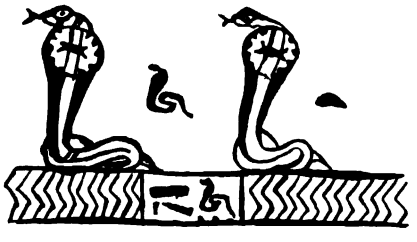
* Red Lake Records, pl. iii, Report of the Bureau of Ethnology, 1885–'86: Dr. Hoffman.

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here developed. The Midē priest in the construction of his lodges causes to be placed in their vicinity cedar trees, as correspondingly may be seen a row of fir trees before the Egyptian representation of Amenti. The fir is not indigenous to the delta of the Nile, and its use in this case must refer to some traditional environment of the Egyptians—a fact of interest in the present investigation.

It has been said that the Egyptian depicted two serpents before the entrance of the under world, or Amenti, and one of these "breathed fire." The Tusayan Indian describes two serpents—a plumed snake and a snake whose "breath can cause death at a distance," and this serpent is represented as having a short, thick body.* His office is to guard the *sipapu*, the sacred opening to the Tusayan under world, as the *cobra di capello* guards the Egyptian under world.





The serpent is an ancient symbol, and when traced to primitive rites it is found to figure the lightning accompanying the summer showers. Its use either in sculptured figurement or in living reality is common in all rain ceremonials among American Indians.

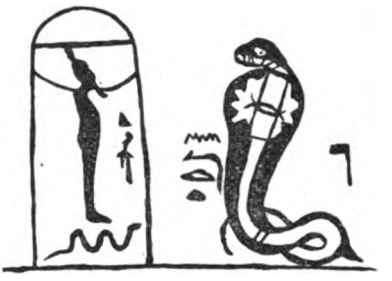
It appears, as has been said above, that two classes of serpents of similar description are each associated with the under world of both Egyptian and Indian myth, but it is yet to be learned if, as in Tusayan rites, the Egyptian associates the serpent with rain; for a ceremonial in which rain is the object is, by nature of the country in which the inundation of a river is the fertilizing agency, entirely foreign and must, in fact, be a survival of

* Dolls of the Tusayan Indians, p. 9: J. W. Fewkes.

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rites belonging to the past. The symbol of rain among the Tusayan Indians, as among the Ojibwa, is a serpentine or parallel line. The Ojibwa line is like that here given from a representation of a scene in the under world on the sarcophagus of Oimeneptah.

This scene, beside showing the association of the serpent with the watery element, also is one of many indications of the importance of the serpent in the rites going forward; for further examination of the sculptures on the sarcophagus discloses it not only as guardian of the dead, but it is a principal figure in all of the scenes represented in the rite*—guard of the shrines of the dead, those mystic chambers wherein the dead await resurrection; it is also companion of Kneph-Ra (Spirit Sun), and it is farther on borne by a procession of men, when it is met by an obsequious group of four personages. At length, as the hours of the nocturnal death wear on, Osiris, lord of the dead, is discovered in mummy form, crowned by a helmet of dominion, and under his swathed feet is a serpent, while before the shrine in which the dead sun is figured appears the *cobra di capello*—the snake which "breathes fire," whose thick, short body recalls the Tusayan serpent which guards the *sipapu* in the Indian myth.



Following the scene in which Osiris appears are others even more weird. The serpent, fastened down to earth apparently to ensure the exercise of its magic power to compel rain, as in early time, by the summer shower, or at a later period, the inundation of the Nile, is under rule of the guide in the "way."

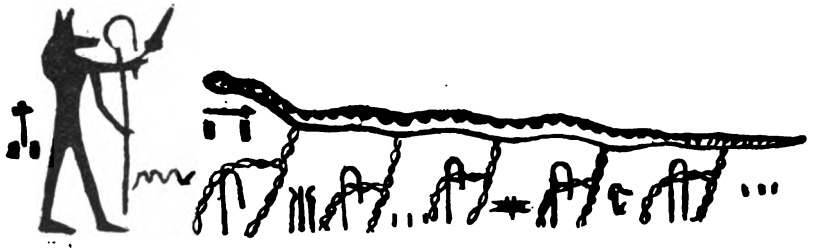
This representation is of especial interest by the association of symbols given. First, we are reminded of the aërial forces invoked by the sail beneath the serpent, which is an Egyptian sign of breath or wind. Secondly, the dominating power of the

* As in the Ojibwa records, there are four chambers ending in a circular adytum representing the final abode of the dead.

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forces appears to be implied by the crook, both in the hand of the god Anubis, guide in the way, and those beneath the serpent.

This crook is a primitive symbol of peculiar interest. It is of constant occurrence in Egyptian representations of the gods as a badge of authority. In the present instance it is in its nominal place in the hand of the god presiding over the special act going



forward, but its reappearance beneath the serpent is of special interest, since it is in this connection associated with the aërial elements, the wind and the waters from above, which are signified by the sail, and serpent brought down to earth.

In the picture representing the judgment of the dead a large crook stands before the judge, on which sits the nude form of a man. Is this the Egyptian's device to represent the deceased under trial?

It is of almost startling interest in this uncertainty of meaning to find that in their rain ceremonials the Tusayan Indians perform an especial rite in which the crook is made to represent the person of the dead.* This rite is accomplished not only by the use of the crook, but snake emblems and "white lightning" also form a part of the symbolism. Beside this fact, one of their divinities is represented with a crook in his hand,† a crook, as also a "flagellum," being a badge of Tusayan deities.

The scene above illustrated transpires in the course of the revivification of the dead and affords a general view of the Egyptian's concept of the elements required in resurrection of the dead. The sail represents the air, breath, or wind, and the serpent the watery element. These two are necessary to life.

*See Jour. Am. Eth. and Arch., vol. iii: Editor, Dr. Fewkes.

†See Tusayan Dolls, pl. vi, 7: Dr. Fewkes.

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The words breath and spirit (ghost) are of one original meaning, and thus we discover that the Egyptian believed that is was necessary to be "born of water and of the spirit"—an idea which has become of sacred import in a later religious dispensation.

The illustration, so full of suggestion, is one of numerous examples in a scene wherein the drama enacted in the under world



appears to concentrate its interests. In this scene are represented women seated upon coils of the *cobra di capello*, the right hand resting on the serpent, the left hand supporting a star; and here also are two masked men, in whose hands are held live, quivering snakes with the well known freedom of the Tusayan Indian in his rain ceremonials.

IV.

It is observable that whatever progress the Egyptian made in a more elaborate finish in the adornment of the temple, the structure was always of a rectangular shape. It is this shape, so adhered to throughout Egypt's history, that is often discoverable in hieroglyphic writing. It appears also in illustration of the text, so declaring its symbolic importance.

It may be seen in the Turin papyrus of the Book of the Dead, where it occupies a conspicuous place, and where in the later rites there described it is accompanied by a snake and the Latin-formed cross, as also the same

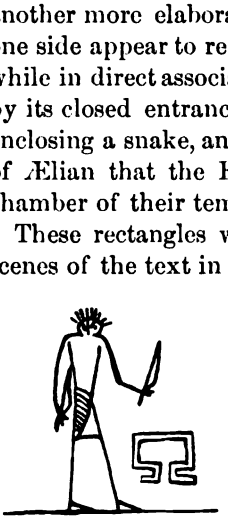


rude portrayal of appeal by the figure of two uplifted arms, which is used in the Ojibwa mnemonics in prayer to the Sky

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God. This rectangle is diversified from an elongated square to another more elaborated figure in which the outjutting lines at one side appear to represent doors, or a place of closed entrance, while in direct association with this elaborated figure, suggesting by its closed entrance a secret chamber, is an elongated square enclosing a snake, an illustration forcibly recalling the statement of Ælian that the Egyptians kept a sacred snake in a secret chamber of their temple.

These rectangles were conspicuously the illustrations of the scenes of the text in this part of the papyrus, which, suggesting their importance, led to a renewed study of other vignettes preceding them, if happily their purport might be determined. The rectangle next discovered was quadrangular, and in place of the closed outjutting lines suggestive of a doorway, the same lines were open and doubled back, so providing an entrance-way; and near this rectangle was represented a presiding figure, which, although in the customary dress of the Egyptian, was unique in appearance, since his head was spherical and decorated by divergent lines, after the fashion of the "Manidos" in the Ojibwa charts given by Dr. Hoffman, while curiously in the Indian chart may be seen the rectangle first observed in







the Egyptian papyrus, representing a closed chamber, and not far away is the figure of the Great Spirit with a spherical head, also decorated with divergent lines. The Great Spirit is accompanied by other spirits, whose heads are of similar configuration. The decoration is conspicuous, and its meaning seems to be implied in the representation of the emblematic bird of

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the totem pole, the owl, whose head is crowned by the same divergent lines.*

The Egyptian figure above given is not a solitary variant, however, in the papyrus; a similar head or mask occurs in two other scenes, and each of these strange figures appears to be the presiding genius of a chamber which, both by its shape and in the fact of so outlandish a keeper, suggests a survival of some portion of a primitive ceremonial; and it was not with great surprise that on continued examination of the same papyrus a representation of scenes very likely to occur in a Midēwiwin ceremonial were discovered, wherein the instruction in the medicinal properties of plants is made one of the initiatory rites, and in which the owl figures as *deus ex machina*.



V.

The kibva of the Pueblo Indian, as also the lodge of the Midēwiwin, is rectangular and, as far as its site permitted, subterranean. Within this chamber toward the north is the *sipapu*, a consecrated orifice representing the place of exit from the under world, where is the path of the dead. It is toward the north the niche for the dead was constructed in the Egyptian mastaba,† whose lengthened axis turned to the north, as does the rectangle representing the "lodge" of the dead in the Ojibwa records. In the Tusayan kibva the covered cavity, the *sipapu*, representing, as it appears, the under-world powers, becomes the center of devotional exercises, as suggested by the devotee kneeling before a rectangle in the Turin papyrus of the Book of the Dead. The *sipapu* of the Tusayan Indians is claimed to be the place of gen-



* A *feathered* owl helmet is used by the Tusayan Indians in their rain ceremonials. Jour. Am. Eth. and Arch., Dr. Fewkes, editor, vol. ii., p. 62.

† See M. Maspéro on the construction of Egyptian tombs: L'Archeologie Egyptienne.

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eration of the human family; it is the *nadir* of the world in which resides the god whose office it is to make germs, the germs of life. Thus in its approach to the under world it appears to be the meeting place or junction of the upper and lower worlds—the path of the living and dead. This sacred square, with its orifice inhabited by the Maker of Germs, recalls that sacred square of virgin earth, emblem of reproductive life used in the rites of the Sioux,* and the stone covering it directs the attention to that stone mentioned by Dr. Hoffman which was placed at the foot of the degree post in the Midē ceremonial. Is this also an emblem of life and shall to it be applied the designation given to a sacred stone in the Book of Breaths of Life—that is, the "Stone of Truth?" However this may be, it is of interest that the rect-



angular figure adopted so largely in Indian pictography* and in oriental construction is represented as an emblem on the censer used in Egyptian ceremonials in honor of Khem, God of Reproduction, so associating it, as among the Sioux, with germinating life, an association already implied by the Pueblo Indians' designation of the god dwelling beneath, as the Maker of Germs; and what says the Book of Breaths of Life?

> "Thine individuality is permanent.
> Thy body is durable;
> Thy mummy doth germinate by order of Ra himself."

The elongated square on the censer of the Egyptian god Khem, the God of Reproduction, directs the attention to the use of the emblem in the rites of the dead, figured on the sarcophagus of Oimeneptah, where a divinity is shown in the act of introducing the head of a serpent into a rectangle, the performance of

* See illustrations of my Masks, Heads, &c.

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which act is overlooked by the "good serpent" of the under world drama. This picture is a valuable suggestion of the statement by the Tusayan Indian that there was a serpent who kept guard of the *sipapu*, the rectangular place within which was an orifice opening into the under world. An alligator whose tail ends in a snake's head reminds us that the rite transpires in a river country. The alligator is not only familiar to the Egyptian, but also to the Central American Indian.



Three ostrich plumes are placed above the Egyptian divinity's head in this picture, as may be seen in another rite, where they are placed above a shrine containing a serpent, and beside which is the Moon God with a striated disc on his head, and in front of whom is the solar eye, with the figure of a priest in the performance of a rite.

The importance of the ostrich plume in Egyptian rites turns the attention to the fact that not only was it used as a symbol in rain rites among the Tusayan Indians, but the sacred pit or *sipapu*, as also the kibva, is consecrated by the sacred feather emblems. The feather, indeed, is conspicuous in all such rites, and is as directly associated with the "place of germs" as it is conspicuous in Egyptian rites of worship to the God of Reproduction, Khem.* In the consecration of his sacred chamber enclosing the *sipapu*, the "place of germs," the Indian priest prepares two feathers, one of which refers to the above and the other to the below—that is, the zenith and the nadir;† and while preparing these two feathers he prays that the dead may be partakers of the joys of the living—an example in itself of the association of the dead with rites relating to the *sipapu*, the "place of germs," while suggesting the Indian belief in the resurrection of the dead, which idea may have had its suggestion in

*See Wilkinson's illustration of the rite.

†The Peruvians called the valley of Cuzco the nadir.

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the birth of plants from the seed buried in the earth; such an idea, indeed, seems to be implied by the term used regarding the *sipapu*—that is, the "place of germs." This conception adds a peculiar interest to both the structure of the *sipapu* and the kibva, in which the sacred cavity is placed.* In a sense, this chamber might be termed the shrine of the dead.

"The tombs of the kings," remarks M. Maspéro, "were constructed on the model of the under world." The mummy, which was described by the Egyptian as "germinating by the order of Ra," was deposited in a deep pit in a secret chamber of rectangular shape, and the pit was at the northeast, as is the mysterious *sipapu* of the Tusayan Indians.

The Egyptian chamber, it must be remembered, like the Tusayan kibva, with its sacred cavity (associated as it appears with the dead in the under world), was also rectangular, its approach by a series of steps.

The stepped figure is a common hieroglyphic in Egyptian writing; but it is an interesting fact in this connection that the figure is especially ascribed to Ptah, the Egyptian's primordial god, who is apostrophised in Egyptian hymns as the "Father of Fathers," "the Maker." His office in the under world is to unite the substances of the human corpse, and in this capacity he is represented on a platform approached by four steps. These steps are conspicuous among the emblems borne on the shoulders of the worshippers of Khem, the God of Reproduction.

It has been said that Ptah unites the substances of the corpse, and in this capacity the stepped figure becomes his especial emblem; and in this connection it should be remembered that the same emblem identifies Isis who, like the Tusayan rain deities, wears the stepped figure upon her head.† It is Isis who resuscitates the dead body of Osiris, whose mummy is seen accompanied by serpents in the first illustration offered in the present paper. Thus in both examples of the use of the stepped figure, the rites of the dead are clearly identified.

Ptah, it will be remembered, is identified by the mask of a frog in one of his disguises. The frog as an emblem of Ptah

*See V. Mindeleff on structure; Dr. Fewkes and Mr. Stephen on myth and tradition.

†See figures in Masks, Heads, etc., *op. cit.*

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becomes a symbol of the vital principle in water—that is, its apparent power of reorganization.

To Isis has been described the principle of humidity, and power over water and humidity are the attributes of the representative divinities of rain ceremonials.

Comparison has been made between the Egyptian Moon God and Omowah, the cloud-compelling divinity of the Tusayan Indians. An interesting parallel may be educed from the fact that by the means of certain processes of layement and white covering of face the dead are believed to be transformed into an Omowûh, as by certain rites the Egyptian dead become Osiriana (or Ounowre). The Omowah, spirit of the deceased, so divinized, assumed the prerogatives of a rain god.





This fact explains the occurrence of rites to the "early dead" or those "gone before," as we should say, in rain ceremonials wherein are made appeals that the dead may partake of the joys of the living.

Resurrection is desirable for the dead as for the plant world; the rain god is an object of appeal, therefore. The magic force of life invoked by the Egyptian, as by the Indian, exists in water, and no more representative rite could be instituted than the Tusayan rain ceremonial.

But if the ceremonial represented in the Book of the Dead is an adaptation of primitive rain ceremonials, there would be not only cases of resemblance, such as the use of the serpent in the rites represented on the sarcophagus, but other objects would appear of apparent primitive origin. And so, in fact, may be discovered by any one familiar with the symbols of the red races.

For instance, the ladder necessary for approach to the kibva,

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and which was consecrated at the time of the consecration of the chamber itself,* reappears in the sculptures of the sarcophagus mentioned above. It is ranged by the side of each actor in one of those scenes where obviously the serpent is the chief object of the rite, as an individual figure on page 253 illustrates. It also is represented in hieroglyphic association with the square, of the symbolic significance implied by the illustration on page 250; for here as there the head of the serpent is directed toward the square, while the line above it suggests that the locality is beneath the surface of the earth. The ensemble of figures indeed might imply a snake rite in the secret kibva, approached only by the ladder given in this vignette.

VI.

The numerous parallels that have so far been cited seem to suggest, perhaps, simply that ceremonialism practiced by different peoples has much the same object. It is the outcome of a desire for life, and from some common instinct similar mimetic methods are adopted through man's recognition that like causes bring like effects; which recognition he appears to share with insects, which for the same purpose make use of alluring or warning colors, assume a digressive mimicry or a protective resemblance, as their necessities require in the preservation of species. All organic life shares in the effort to preserve itself, and the lower and higher world dramatize to that end, masquerading in borrowed paraphernalia. It is not strange, then, that there should be a great similarity of means in the performance of religious rites, since those rites have similar ends—that is, the preservation of life. Man, whatever country he occupied, might resort to dramatization, mimicking those forces, elemental or animal, which he believes create or contribute to life, this being done by means of symbols and adroit personifications, the universality of these customs becoming the fruitful source of parallel notions.

But in a comparison between Egyptian rites and primitive rain ceremonials we confront civilization with barbarism. The

* See Pueblo Architecture: Victor Mindeleff, Report of the Bureau of Ethnology, 1886–'87.

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rites of the Book of the Dead are those practiced by a people whose civilization is estimated to have existed four thousand years, and the parallel notions, with all the cumulative testimony contained in both writing and picture, to those of barbarians are suggestive of a survival of ancient ceremonials—ceremonials, too, now practiced by the red races. This fact is full of ethnic interest and might be the basis of a treatise of great ethical importance. However, it is the object here to produce facts and not philosophize. In the comparison of the Midēwiwin ceremonial with the rites represented on the Oimeneptah sarcophagus it may be objected that the Egyptian represents scenes in the under world, which is not the case with the Ojibwa rite. The Egyptian proceeds with the setting sun, while the Midē ceremony ends at this point. But the rites of the Midē include the rites of the dead as well, if occasion demands.

At the death of a novice, who is about to be initiated into the Midēwiwin, relates Dr. Hoffman, the deceased Indian lad is personated by his father, who represents his presumable movements on the path of the dead, enacting a drama which has for its end final entrance into the desired haven of Midēwiwin. This representation is in fact a delineation of the path of the dead, and its bourne is the entrance of the path of the living. Such indeed is the end of the Egyptian rites of the dead. The dead follow the "dead sun" to its rebirth in the land of the living; and his living path, is it not down those lotus-columned temples which gradually led the Egyptian devotee into the shadowy region of the adytum imaging the departed light of the sun?

Each ceremonial among the Egyptians appears to look to resuscitated life, and wherever appeal is made water is the principal emblem, and with that emblem is associated the snake. This is true of Indian rites.

In a Nahuatl ceremonial a statue of Tlaloc, god of the rain, was placed before a pool of water, wherein were frogs and snakes, and at one epoch of the drama the snakes were seized in the teeth of the actors and carried off into the procession, where they were presumably swallowed.

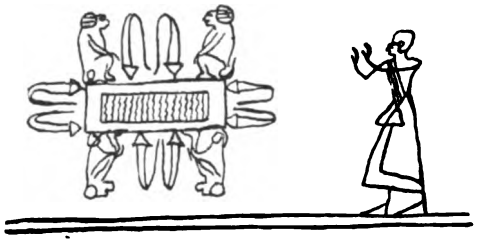
This rite was performed once in eight years for the avowed purpose of restoring life to plants—"the rejuvenescence of food

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plants." The actors wore masks figuring animals and birds, among which the owl is especially mentioned.*

Thus, as in many other accounts of what has been characterized as a snake dance, the emblems are those known in the Egyptian rites. The owl, the frog, and the snake are always figured in the primitive rite, in which also a rain god appears as chief figure.

In the Egyptian representation of the rites of the dead a pool is pictured, upon whose borders sits the Luna God with the striated disk upon his head. An Egyptian devotee approaches this pool with uplifted hands. The burning censers on all sides remind us of the fact that fire was the purgatorial element of the Egyptian as among the Tusayan Indians.



It is related that the ancient Hindoos were accustomed to bury their dead beneath the water of some stream whose current was turned aside for the purpose, when, the burial accomplished, the waters were permitted their natural course, covering the grave.

There is a saying among the natives of Greenland that when a man sleeps by the river he hears the singing of the dead.

The funeral procession of the dead was required to pass a sacred lake consecrated for the purpose near every large city in Egypt, and at the beginning of the funeral ritual were often represented four rudders, each of which was applied to one of the four cardinal points.

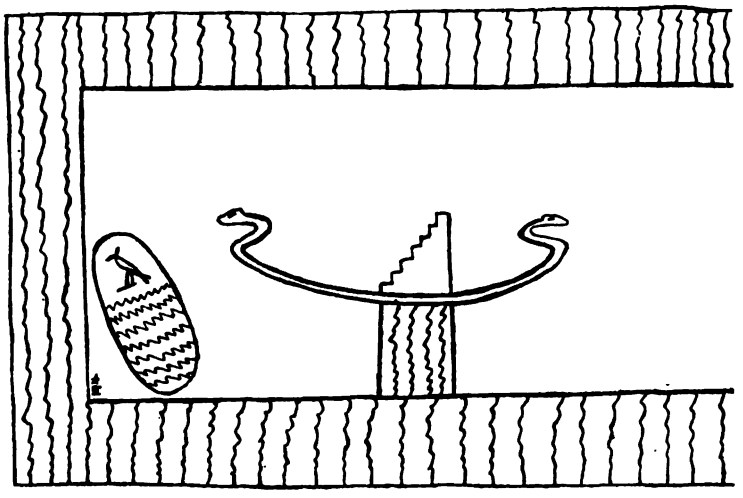
The most important festival of these people was that celebrated in the summer solstice in honor of the Nile, when an invocation for the inundation was made to the deity of the river, and the god Nilus is represented encircled by a serpent beneath the rocks of a cataract pouring out the sacred waters from a hydræ held in his hands.

*See "A Central American Ceremony (including Dr. Seler's translation of the Nahuatl), compared to Tusayan rain ceremonials, by Dr. Fewkes.

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According to Herodotus, if the drowned body of an Egyptian, or even a foreigner, is found on its margin, the neighboring town is obliged to embalm it in the most splendid manner, when it was entombed in one of the sacred sepulchers. No one, not even a friend, was allowed to touch the corpse, the priest of the Nile alone having that privilege.

But not only were the waters of the Nile sacred to the living and a lake consecrated to the dead, but, to emphasize the emblem, as it has been said, it is placed in the hands of the goddess of the under world. In Egyptian writing it appears in phrases such as "spirit of water," "the source." It is a conspicuous



hieroglyphic in the verb "to live;" also in "living" and "light." For it may be claimed the same meaning which it has in Ojibwa mnemonics—that is, a magic power over both life and death.

In that interesting ceremonial, which has been preserved in Peruvian annals, wherein it appears that, like the Egyptian, this remarkable people set apart a lake* for rites of worship, the revivifying powers of water appear to be suggested. Preparatory to the ceremony, states the narrator, there were thrown across the lake two ropes, forming equal angles, which, like the four Egyptian rudders in the rites of the dead, may have pointed out

*The lake Gualvita.

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the four world quarters.* This accomplished, the Prince of Peru, anointed with oil of turpentine and gold, accompanied by his retinue, embarked from shore, when, on reaching the magic spot of the intersection of the ropes, he precipitated himself into the divine element amidst hymns of praise sung by his people, who stood on shore watching the performance of the rite, and among whom appeared two ancient men clothed in the sacred *atarraya*, a garment fashioned like a fish-net, this garment being the symbol of death, the remembrance of which is so constant in the rain ceremonials of the Pueblo Indians.

"The Egyptians represent," remarks Herodotus, "the sun and moon in boats, so implying that their movements depend upon



humidity." The solar bark is represented upon a river in the under world, as is here illustrated, where may be recognized the goddess Isis with the stepped figure upon her head, Nephtys, her sister goddess, standing at her side. The voyaging mummy sits within the shrine, a scarabeus† on its head, sign of solar action, the vivifying power of heat. Here is also an open lotus, lying upon the disk of the sun, which rests upon an altar. The river depicted beneath, as also the boat, imply that all renewal of life depends on water; even the sun's action depends upon

*See ceremonial of taking possession of the valley of Cuzco, in which a stone was slung to each corner of the four quarters of the world. Antiquities of Peru: Rivero and Tschudi.

† It is of importance to note that the Tusayans have also a sacred beetle in their myths. This beetle lives on an herb that is used to cure snake bites, an example of an association of ideas of constant recurrence in primitive rites.

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that element; and to be explicit, that as human life exists by its fertilizing power, the Egyptian has added the water symbol directly beneath the mummy.

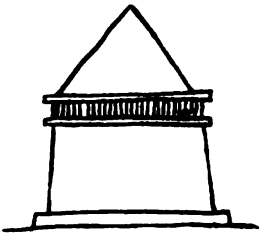
In this under world the gods are not only guardians of the voyaging mummy, they are laborers in the field. Tall stalks of grain are seen flourishing upon the borders of streams. Such is the employment of the Hopi divinities in the under world.

The Egyptian artist is munificent in his display of the beloved element, which in the under world is the spring of eternal life, as an example of which the figure on page 257 is given; for in this illustration may be seen the "stepped figure" elsewhere mentioned, beneath which is the rain symbol, the two signs being contingent that are of constant occurrence in the figurement of Tusayan rain gods, their helmets being principally rain, cloud, and stepped figures.

Description has been given above of a Peruvian rite in which the Prince of Peru disports himself in the waters of a sacred lake. Such was the custom of the kings of Egypt previous to an act of adoration in the temple.

This custom seems to have suggested a scene represented in the sculptures of the sarcophagus of Oimeneptah. As the happy soul approaches the final abode of immortal life, he enters a stream of water and disports himself. The action of each individual betrays eagerness at one moment, devotion in another, and finally a divine ecstasy seizes him, when he assumes all the barbaric postures of an Indian dance.

So men repeat themselves; and what our aboriginal races have done Egyptian civilization renewedly repeated, adhering like all ritualists to the letter of the laws laid down in a traditional past.



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A STUDY OF CERTAIN FIGURES IN A MAYA CODEX.

BY J. WALTER FEWKES.

The object of this article is to discuss the symbolism represented in figures of a supposed deity of the Codex Cortesianus. It is believed that this symbolism is so well marked and constant that the figures by which the delineator intended to represent this personage can be recognized, but that it is well to have in mind a clear conception of the variations which occur in different representations. I have therefore picked out and figured all* the pictures in this codex which I believe represent one and the same deity, and have examined them with a view to arrive at a conception of the idea of characteristic symbolism in the mind of the delineator. It is hoped that opportunities may come to examine and classify on a basis of their symbolism other figures in this codex in a similar way, and to extend the comparisons by a study of the other codices.

Objects ornamented with symbolic figures of supernatural beings are from time to time being dug up in the ruins of Yucatan, and the monuments themselves are covered with bas-reliefs and other representations of supernatural beings. Evidently it is profitable or even necessary to have clearly in mind what personage is intended to be designated by certain symbolic marks as an introduction to this study. The present article is, therefore, simply an effort to describe the modification in symbolism of one deity as expressed in a single codex. It is intended to follow it with a discussion of the same in the other codices, and finally to carry the knowledge thus acquired to a consideration of the glyptic representations on the ruins, where the symbolism becomes most complicated of all.

When we examine the figures of human beings in the Codex Cortesianus we find their most marked differences to lie in the

* With the exception of one figured in my article, "A Central American Ceremony," etc., *Am. Anthrop.*, July, 1893.

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heads.* The bodies do not greatly differ, but the drawing of the heads always distinguishes the personage represented. This is a common feature in the art of all primitive peoples, and the head is adopted without hesitation as the part upon which we can safely build a classification of the figures.

I find, in my endeavor to classify this symbolism, thirty-eight† figures in the Codex Cortesianus which fall in my first division, and which, for want of a better name, I will follow others in designating the "Long-nosed God."‡ The further separation into two groups may be a purely artificial one, and the differences in the head-dresses illustrative of artistic "technique" in their representation by the writer of the codex.

The adoption of the head as a basis of classification is justified by comparative studies. I believe all other parts of human

* This same principle is carried out in the hieroglyphs, as shown by Seler in his most valuable contribution (Caractères des Inscriptions Aztèques et Mayas, p. 7), "Dans le plus grand nombre de cas, ils montrent la tête de la figure en question, pourvue, en general, d'un signe distinctif qui ne permet pas cependant de faire présumer aucun rapport avec une forme déterminée de nom. L'hieroglyphe du tigre montre la tête du tigre" * * *

The aboriginal habit of designating the *characteristic symbolism* of a deity *by the head alone* has been amply illustrated for the Hopi Indians in my articles on "Tusayan Pictographs," *Am. Anthrop.*, January, 1892, and "Dolls of the Tusayan Indians," Int. Archiv für Anthropologie, 1894, q. v.

† Schellhas found thirty figures of the Long-nosed God in the Codex Cortesianus. I have figured thirty-eight which can, I believe, be legitimately placed in this group as represented in the same codex. I have used in my studies Rada y Delgado's reproduction of the codex, but have also examined the original in Madrid.

‡ My method of study has been to limit myself to the figures themselves in order to determine the symbolism which characterizes them and separates them from others. A consideration of what others regard them is not passed by as unimportant, but the codices themselves are interrogated as the sources of their information. It will no doubt be said that the accompanying hieroglyphics explain the figures, and that they should be given prominence. I have not set for myself the ambitious task of deciphering the codex, least I should by so doing add one more theory to the several with which the study is now burdened. The figures are to me at this stage of my work like so many pictographs, and I simply seek to discover the characteristic symbolism of a god so that I may recognize his picture when I see it elsewhere.

The object is to try to place before the reader the essential symbolism of the god by which he was recognized in the Indian mind. If on comparison figures and glyphs tell the same story, this contribution will not be in vain; but if the two are divergent in their teaching, it is well to know that fact. I believe the figures illustrate the text, if we may be permitted to speak in this way of the glyphs, and that at the present state of our knowledge we walk on firmer foundations when we draw conclusions from them than upon the doubts which underlie even the elemental theories of the signification of the highly conventionalized symbols. Much as a Champollion is needed in the study of Maya hieroglyphics to teach us to read them, and with the knowledge of the fact that before his time unsuccessful efforts to decipher the Egyptian hieroglyphics by the figures were made, we cannot regard these efforts as fruitless.

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figures are subordinated to this by primitive people when they represent the symbolisms which characterize their deities. Identities or similarities in the head are regarded as good bases of classification in the study of the relationship of these figures. Theoretically, I believe that when the symbolism of the head is different, different gods are represented, a conclusion which can also be successfully defended on the ground of comparative studies. I have yet to find a primitive people who fail to adopt the head as the part to symbolically distinguish their gods, provided they ever do designate them either by personations, glyphs, or pictographs. One more theoretical aspect ought to be mentioned: Analogy, rather than authority, implies that the human figures represented in the Maya codices with grotesque heads of such widely different symbolism are pictures of supernatural beings. The constancy of the symbolism elsewhere would seem to prove that these grotesque heads have an important significance. These figures are not of men engaged in secular occupations, but of supernatural beings with human bodies and symbolic heads.* Such conceptions are paralleled so often among the writings of primitive peoples that it will need strong arguments to prove that the Maya codices are exceptions. As the symbolism of the different supernatural beings was expressed by personifications wearing masks in Mexico as in many other parts of the world, I have called the head the mask or helmet, although I have no authoritative evidence that a man personifying the Long-nosed God ever appeared among the Mayas. So universal is the custom of personification in this way that one can make no mistake in speaking of the symbolic head of these codex figures as masks or ceremonial helmets.

There have been several attempts to define the symbolism of this god, one of the most important of which was made by Schellhas, whose description is, in the main, accurate for the Codex Dresdensis, and with some modifications for the other codices. Schellhas† gives the following diagnosis of the symbolism and characteristics of the Long-nosed Deity; but while these hold in most instances for this personage as represented in

* That some of the figures in the codices represent human beings engaged in secular occupations does not prevent one interpreting those with elaborate helmets or masks as representations or personifications of deities.

† Die Maya-Handschrift der Königlichen Bibliothek zu Dresden, p. 49.

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the Codex Dresdensis, they are not always valid when applied to figures in the less artistic * Codex Cortesianus :

1. Die schlangenartige Doppelzunge, von der ein Theil vorn am Munde, der andere am Mundwinkel seitwärtz sich herausgeschlängelt.

2. Das von eigenthümlichen Verzierungen umgebene Auge.

3. Die lange, nach unten gebogene Nase.

4. Der Kopfschmuck, von dem sich indessen einige Abweichungen finden.

The figures of this personage in Codex Cortesianus lead me to a somewhat different interpretation of the first of these characters so well marked in Codex Dresdensis. The structure "vorn am Munde," identified as part of the tongue, does not seem to me to be a part of this organ and is not represented in figures of the Long-nosed Deity in Codex Cortesianus. Whatever was intended to be represented I do not know, but in figure 33 from Codex Cortesianus we have a singular object in the mouth which is comparable with the object referred to.

That Schellhas regarded this bifid character of the "tongue" as an important feature may be seen from the statement on page 51, *op. cit.*, "Er ist stets durch die aus dem Munde herabhängende, doppelte, schlangen-ähnliche Zunge . . . charakterisirt." This feature, which is given such a prominent place in his diagnosis of the deity, fails completely in the Codex Cortesianus, for, except in two instances (29, 33), where we find an object † which has no likeness to that indicated as characteristic by Schellhas, it is absent in the majority of cases. It is

* As has been repeatedly pointed out, the figures of Codices Cortesianus and Troano are drawn with less care than those of Dresdensis and Peresianus. While this at times presents many difficulties, it seems to me to have likewise advantages as showing the simple symbolism intended to be expressed, for in the less elaborated work the essential symbolic markings would disappear last of all.

† What this object is I cannot say. The dots upon it recall those found on the body of some of the snakes depicted in the codex. The ceremony of carrying the snake in the mouth is known as once existing in Mexico and at present practiced in Tusayan.

Although the "part of the tongue," "vorn am Munde," is well figured in Schellhas (Fig. 7), his figure differs very markedly from that in the copy of Cortesianus published by Rada y Delgado, copied in my figure 3. In Schellhas' figure it is single, resembling that in Codex Dresdensis. As the copy with which I have worked claims to be photographic, and as the double character of the body referred to is clearly marked, I have regarded Schellhas' figure as a poor copy of the original.

Although common enough in Codex Dresdensis, I have not found in my copy of Codex Cortesianus an anterior appendage to the mouth of the Long-nosed God of the same shape as that figured by this author in his figure 7.

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interesting to note that in both these instances the helmet is different from the others. They belong to the second division of long-nosed deities.

The following diagnosis gives the main features of the mask of the Long-nosed God in Codex Cortesianus:

1. Nose prolonged into a curved prolongation hanging down in front of the mouth, its lower end curving outward. In one instance this appendage curves directly upward, ending in a scroll with rectangular blocks on the outer edge. This organ sometimes has round spots on the surface.*

2. A single curved body hanging downward from the angle of the jaws.

3. Eye bounded below by an S-shaped figure with rectangular marginal blocks.

4. Trifid ear ornament.

5. Tooth-like bodies in upper jaw; absence of teeth in the lower.

6. Appendages to the top of the helmet-mask of two kinds. Of these features 1, 2, and 3 are constant and sufficient for identification; the remainder are likewise constant, but not distinctive. The deity cannot be identified by the use of any or all of the last three, since they are found in the helmets of other gods.

Five of the thirty figures of the first division and none of the second have a hatchet-like implement in one hand. The same number have in one or both hands a torch or a brazier (?) with flames issuing from the extremity.

Four (11, 12, 13, 14) are represented as in the act of planting; one (17) holds a bowl to receive water, and one (8) empties water from a bowl. Six of the first and three of the second division have empty hands. One (31) holds a cord, and one (15) a forked object. Two (18, 33) hold a mask, and two (24, 32) a *kan* sign in the hand.

Fourteen are represented standing; the same number seated. Of the former four have legs and arms akimbo as if dancing. Two (10, 16) are lying down, and one (28) appears to be falling in the midst of rain. One (26) has the mask placed in a reversed

*See Schellhas' note, p. 16 (Vergleichende Studien): "Der Kopf dieser Figur ist auch deshalb interessant, weil er das an den Yucatekischen Gebäuden so oft vorkommende merkwürdige Ornament, der vielbesprochenen sogenannten Elephantrüssel erklärt. . . . Zu phantastischen Zoologischen Spekulationen ist nicht der mindeste Anlass."

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PLATE I.

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position on the head. In all figures the face looks to the left of the page.

In several figures a dorsal object of unknown meaning can be discovered. This is not to be confounded with the sac in those in the act of planting. In this instance the sac attached over the shoulder by a cord is the seed bag (11, 12, 14).

The necklace with a medallion piece with two or more pendants are found in several figures often hanging below the loins. In some instances it is difficult to make out whether this medallion is fastened to the necklace or to a girdle about the loins. The former is the more natural supposition.* The cravat-like bodies on the breast of figure 34 are apparently ornamental, as an object comparable with a medallion is suspended from the lower end.

Oral Appendage.

No figure referred to the Long-nosed God in the Codex Cortesianus is destitute of an appendage hanging from the corner of the mouth, and the figures of no other deity † in the same codex possesses this singular organ. It may therefore be considered one of the important characteristics. In many, but not all, figures of snakes we have the same structure, and in several instances it is the one structure absent in the figures of the "Old Man" God by which he can be distinguished.

It is difficult to determine what this oral appendage is intended to represent. In several figures of snakes we find in addition to it an undoubted tongue, bifid at the extremity, extending beyond the mouth, and resembling a flagellum. Until some better evidence is presented than has yet been published, one must regard this oral appendage as problematical. There is not even enough proof to demonstrate that it is an oral structure and not a foreign body.

Appendages to the Top of the Mask.

The figures of the Long-nosed Deity are divided into two groups by the differences in the cephalic appendages. Their

* See the same in clay images and stelæ: Schellhas, Vergleichende Studien, p. 15.

† Three animal heads, however, have this oral appendage. One of these is a bound quadruped with symbolic marks recalling those on the body or the snake on its back the other two likewise with serpentine necks.

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differences may be seen in the accompanying figures.* It is not necessary for me to point out the differences, and I find no homology between them. It may be that no new conception is intended by this difference in head-dress, as the other features of the masks are identical, but I believe they are intentional differences, and hence of significance.

As an accompanying feature, it is to be noted that in several figures of the second kind a snake is drawn across the mid-body, a position which is never represented with the majority of the figures of the Long-nosed God and with none of the first kind. Likewise that in none of the eight of the second division is the breech-clout or *maxtlatl* present, with possibly one exception.

Figure 28 is instructive from the fact that it contains so much symbolism. Many of these symbols I cannot satisfactorily explain, but it seems to me that the position of the dumb-bell-shaped figures, out of which falling water is depicted, supports Schellhas' view that these may be regarded as rain-clouds. I have no new suggestion to make to those of others in regard to the quadrate figure between them and the Long-nosed God. It is suggestive that the body of the snake issues directly from one end of this quadrate figure. One is tempted to carry a Hopi conception into a study of the symbolism and regard the snake in this figure as a *ta-lu-wi-pi-ki* or lightning, but I have not enough evidence to defend this theory. I see no good ground for regarding the snake as a cloud symbol, except indirectly or perhaps related to the thunder-cloud. The association, however, of the snake with the lightning is not a strange idea to some tribes of American aborigines. The association of symbols in this figure, more especially the rain-clouds, rectangle, and snake, recall similar figures in Troano (Figs. 24, 25).

The existence of figures with objects in one or both hands recalls an important fact of a comparative nature. In his interesting account of the bas-reliefs of Cozumahualpa, Seler† points out the characteristic of the figures holding masks in their left hands. This has also been shown to be the case in other Central

*Schellhas enumerates only thirty representations of the Long-nosed God in the Codex Cortesianus, which is exactly the number which I find of the first kind. As the additional eight would not fall in any other group mentioned by him, I cannot reconcile our differences in counting. My plates include all figures of the Long-nosed God in the Codex Cortesianus which I refer to that category.

† *El Centenario*, No. 26, Madrid.

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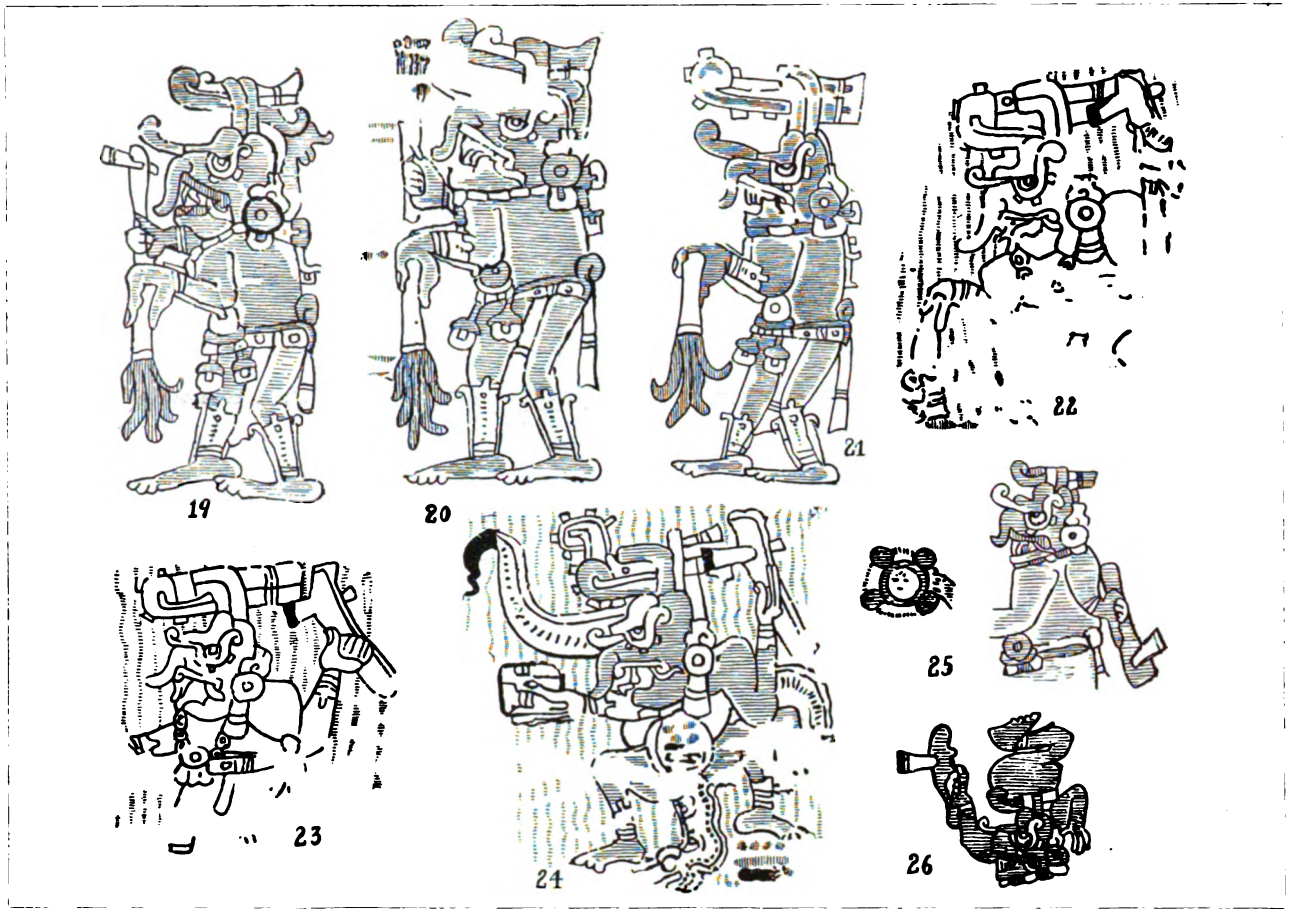


PLATE II.

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American figures, and Cushing mentions it in an embossed copper plate and shell gorgets from the United States.* Among the Hopi Indians the left hand is that with which the mask of the ka-tci-na is put on and taken off, and into it the personator receives the *pa-ho* or prayer plume.† It would seem from the similar predominance given to the left hand in Central American bas-reliefs that the custom also held among these races. In the figures of the Long-nosed God one or two figures hold mask-like objects, possibly offerings, before them in which the left arm and hand are shown, but it is not clear that the right hand was not also used or that the object was held in both hands. It is interesting that the planting stick is held in the left hand in the several figures where it is represented.

In several figures of the Long-nosed God which have the planting stick in the left hand and what appears to be seeds falling from the right in Codex Troano the symbol *kan*, with apical projections, is found apparently on the ground or near the point of the planting stick. If *kan* in these instances means maize in some form, there is nothing out of harmony with the action of the accompanying figure. The same may be said of those figures as one in Codex Troano, where the same god empties a jar of water upon a *kan* symbol. The signification of *kan* (= yellow) does not militate against the idea that *kan* may mean at times simply maize or, as Seler insists, that the same has a relation to one of the world quarters.‡ There is no reason, except those of a comparative nature, to decide whether or not the *kan* symbol of the individual figure (Fig. 24) is maize.

The fact that two (24, 32) of the figures of the Long-nosed Deity in the Codex Cortesianus carry the well-known glyph *kan* in the hand leads me reluctantly into the complicated question of the significance of this hieroglyph. This symbol is a common one in the hands of this and other deities in the several codices. In the many different interpretations of *kan* it is diffi-

*Am. Anthrop., January, 1894.

†The left hand among the Tusayan Indians is called *kya'-kyau ina*, desirable, sacred, and is always used to receive sacred meal and to perform *na-ro'-tci wa*, purification. The right hand in some parts of India is regarded unclean, and among the native soldiers of certain semi-independent princes the *left* or sacred hand is used in saluting officers or making salaams. I have not discovered that the right hand is regarded unclean by Tusayan people.

‡See in this connection the cloud charm altar with six ears of corn among the Hopi. (Journal of Amer. Eth and Arch., vol. ii, No. 1.)

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cult to find any which satisfies all requirements, but approximations have been made by different authors.

The most trustworthy conclusions in regard to the signification of *kan* are by Seler, who, among other things, has pointed out that the Meztitlan equivalent of this day sign is "*xilotl* (le jeune epi de mais)."* Thomas, in discussing a compound glyph (Cort. 11[b]), which he calls "ynah (kan)" or inah, says "the *kan* is here in all probability the conventional symbol for grain or grains of maize." Seler calls the attention to the definition of kaan in the Maya lexicon of Perez, "abundante, necessario ó estimado, cosa importante." One of the things† in the ancient Maya life which was wisely estimated as most necessary for their existence, and as evidence would lead us to hope abundant, was the beautiful Indian corn (*Zea mays*), the aboriginal food of so many tribes of the American race.

Schellhas (p. 20, *op. cit.*) follows Thomas in regarding *kan* as the corn symbol. He says: "Es scheint dem auch nach meheren Stellen im Codex Troano, auf die Cyrus Thomas auf merksam gemacht hat, ziemlich sicher, dan das Zeichen Kan ein Getreidekorn darstellt, oder wenigstens ursprünglich ein solches dargestellt hat."‡ He likewise points out reasons for considering it a symbol of the field of maize and the many instances in which it is held in the hands of different deities.

The heads are always represented with the face in profile, even when the body is viewed ventrally. It is not impossible that the head-dress of the second kind is simply a front view of an object shown laterally in those of the first kind. In most of the standing figures both legs are represented without regard to perspective when the body is viewed laterally. In seated figures only one leg is represented. This, however, is not a peculiarity

* According to Brinton, "xilotl, ear of corn."

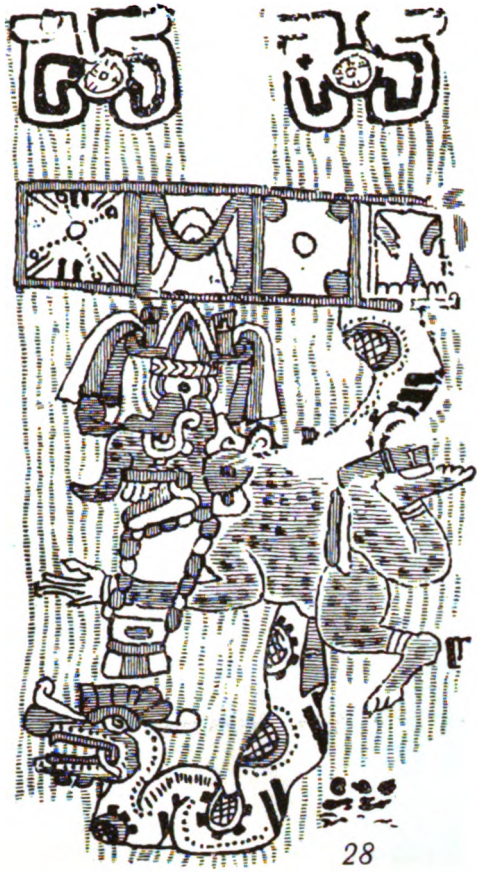
† To use a concrete example for a general conception, according to Brinton ("The Native Calendar of Central America and Mexico"), the Kiche-Cakchikel name of the eighth day is "*kanel*, the guardian of the sown seed," probably from *kan*, yellow, referring to the yellow grains of maize." See Scherzer, Boletin de la Sociedad Economica de Guatemala, December 15, 1870.

‡ It would in fact be a most extraordinary exception if among all the symbols used in the codices the symbol of the maize should have any subordination in number to others. Among the Hopi, where the maize is likewise the "national" food, the corn symbol is very frequently used in religious paraphernalia. The places where the symbol *kan* is found—in jars so placed to resemble offerings, in sacks on women's backs, in the hands of deities, on the ground in front of a figure who is evidently planting—all lend high probability to the belief that *kan* in one of its possibly many meanings signifies corn in some of its forms.

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PLATE III.

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of the art of the Mayas, as in other figures we find seated persons with both legs represented or even crossed, which implies a higher knowledge of drawing than that shown by the most primitive aborigines of America. The seated figures of the Long-nosed God, as those of most male deities represented in the codices, have the prescribed squatting posture universally taken by participants in Hopi ceremonials. This posture, however, is not a common one in figures of female deities, who ordinarily have their legs folded under them or crossed when seated.* This is likewise a custom among Hopi women when ceremonially engaged.

In none of the figures is a neck differentiated from the body, but the head rests on the shoulders as the mask in the Hopi katci'-na(s). I believe this lack of neck is significant, for in Maya figures in bas-relief or stucco where an unmasked face is represented the neck is well drawn. It is only in those figures where the head by its monstrous face is evidently not human, but a mask, that the neck does not appear. Throughout the codices there is rarely ever any effort to represent a neck, and in most cases the head or mask rests on the shoulders, giving a stunted appearance to the figures. This is not a characteristic of primitive art and may have a reason in these figures. The explanation suggested above seems possible.

Figure 36 is instructive in several ways. The upper figure is surrounded on three sides by serpent bodies, and on either side the dependent tails of the rattlesnake are depicted, one of which hangs from the sign *kin* (sun). The figure below has the legs placed in the manner generally common in pictures of seated female deities, and over the head bears a mammiform figure comparable with the figures of the breast.† In her hand she carries an object similar to that identified by Schellhas as a fan (p. 21, *op. cit.*). Out of the snake's body seem to issue parallel lines symbolic of falling water. As there are several instances in the codices where falling water seems to come from the snake's body, this feature is not exceptional, nor is the association of the snake with water unusual.‡

* In one instance the deity has the legs crossed apparently as in the case of seated women deities.

† In some figures of the tail of the snake we find similarly pointed black tips.

‡ Such a conception is in fact almost universal among primitive people.

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The following table gives an enumeration of the numbers of the figures of this deity associated with the snake or the water symbol:*

1.	Figure of the god with symbol of water	20
2.	" " " " " " and snake	9
3.	" " " " figure of a snake	10
4.	" " " " " " without water.	1
5.	" " " " symbol of water, without snake.	11
6.	" " " without symbol of water or snake	17

Analysis of the Above with Reference to Figures.

No.	Figures.	
1	2, 4, 7, 8, 11, 12, 13, 14, 17, 19, 20, 21, 22, 23, 24, 27, 28, 36, 37 + *a* †	20
2	19, 20, 21, 24, 27, 28, 36, 37 + *a* †	9
3	2 (?), 19, 20, 21, 24, 27, 28, 36, 37 − *a* †	10
4	9 (?)	1
5	2, 4, 7, 8, 11, 12, 13, 14, 17, 22, 23	11
6	1, 3, 5, 6, 10, 15, 16, 18, 25, 26, 29, 30, 31, 32, 33, 34, 35	17

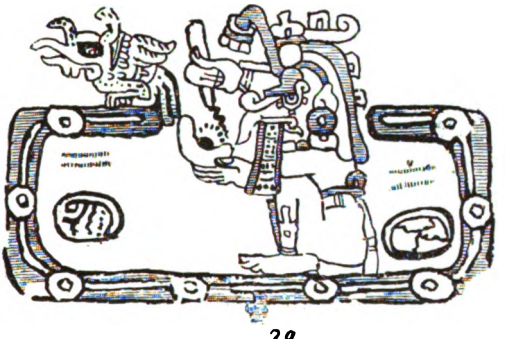
From the above tabular view the conclusion seems logical that there is some association of water or rain with the deity represented and designated the Long-nosed God.‡ As far as I know, the best students of Maya symbolism have regarded the Long-

*The figure of a snake can easily be recognized; that of water or rain is a number of parallel lines, as shown in the plates.

† Figure in "Central American Ceremony."

‡ Other figures with none of the symbolism of the Long-nosed God are likewise associated with falling water or rain, but in none is the relation so constant in the Codex Cortesianus. According to Thomas, "The serpent, as we know and as is made very apparent in the codices, is a symbol of moisture." ("Are the Maya Hieroglyphs Phonetic?" *Am. Anthrop.*, July, 1893, p. 248.) The same author (p. 267, *op. cit.*), in his interpretation of Codex Cortesianus (35b), says, after calling attention to a character which he is "inclined to believe" . . . "refers to the eclipse of the sun:" "The figure below the text, which shows the sun in the heavens surrounded by clouds, while the great plumed serpent is in the act of swallowing it." I do not wish to express an opinion on the interpretation of the group, but believe that the reptile represented is the great plumed serpent, as in the cases when it appears with the Long-nosed God.

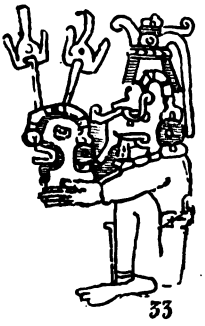
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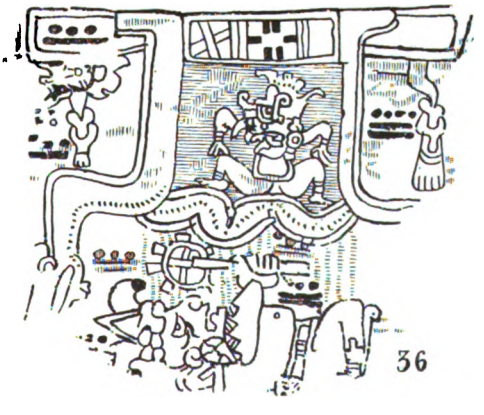

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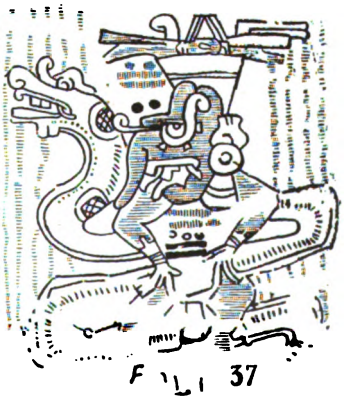

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PLATE IV.

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nosed God as a rain god or a parallel conception with a Mexican rain god, Tlaloc.

In my article on "A Central American Ceremony"* I pointed out the homology of the mask of the Long-nosed God and that of an accompanying snake. I supposed, from comparative studies, that the figure of the snake was that which is ordinarily called Plume-headed snake, and therefore my conclusion was that the mask of the human being was likewise a snake mask. The theory that the maker of these figures intended to represent the Plume-headed deity is supported by the testimony of the Hopi priests. While it is commonly said that the Long-nosed God is a Maya equivalent of the Mexican rain god, Tlaloc, yet there is little in common in their symbolism. I believe the Long-nosed Deity is a rain god, but likewise a snake god, as indicated by the mask. The printed accounts of Maya mythology throw a somewhat obscure light on an identification of the Long-nosed God, but it looks as if Schellhas were right in referring it to Ku-kul-can.

Such a conception is not a forced one in the mythologies of American aborigines. Many instances of the snake deity as a rain deity might be mentioned. I therefore believe that Schellhas is right in his interpretation of the Long-nosed God, notwithstanding the identification is not accepted by some of the foremost students. Whether the name is Ku-kul-can or not is another question which is wholly foreign to my conclusion. I believe the "Long-nosed God" is a snake rain god, and if it is universally agreed that Ku-kul-can is the proper name for such a conception, these figures represent this god. My reason for my identification as a snake rain god is built wholly on the contents of the codex, which cannot be affected by discussions as to whether Ku-kul-can is a cultus hero or not.†

It is interesting to note, in connection with the possible relationship between the figures of the snake and the Long-nosed God, that among the Hopi, Pa-lü-lü-koñ is regarded as the pet of O-mow-ûh or the Rain Cloud Deity. Many of the Hopi divinities have their pets, which are sometimes figured with them. Of such a nature is possibly *Po-ke-ma* or the pet of Tuñ-wup'-

Am. Anthropologist, July, 1893.

†See, for instance, the figures in my colored plate in "The Central American Ceremony," identified by Seler as "Tlalocs."

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ka-tci-na, represented on the upright of the altars of Walpi and Mi-coñ-in o-vi, as shown in my account of this interesting ceremony.*

Of all the figures of the Codex Cortesianus those most liable to be confounded with the Long-nosed God are the twenty-five called by Shellhas the "Old Man God."† Although the symbolism of the members of the two groups is similar, the latter differs from the former as follows:

1. None have the oral object or teeth in the upper jaw.
2. The nose is of different form, never extending to the mouth or below it.
3. Appendage above the nose is wanting.

The snake is associated with but one of the twenty-five figures of the "Old Man God." One holds the parallel lines symbolic of falling rain. The majority have objects in their hands, but none hatchets or torches. The day symbol *akbal* is held by many.

It is not possible to say that a somewhat similar conception did not exist in the figure of the Old Man God, and that of the Snake Rain God, but the symbolic differences of their masks are constant.

Although the symbolic characters of the Old Man God are well defined with one exception, the symbolism closely resembles that of the "Long-nosed God." I have provisionally followed Schellhas in separating the two, and find no difficulty in distinguishing members of these two groups from other gods figured in Codex Cortesianus.

From comparative studies it might seem that in figure 9 we have a Long-nosed God seated in the open mouth of a serpent. Although there is some reason for the adoption of this theory, I am not at present prepared to accept it.

Closely connected with this hypothesis is the theory that the God "C" of Schellhas' nomenclature, or the "God with lines drawn through the face," may be a snake god. There are remarkable homologies between the heads of this figure in some of the thirty-four examples in Codex Cortesianus, where the theory that it represents a snake god may find standing ground.

*Journal of American Ethnology and Archæology, Vol. ii, No. 1.

†God with the old man's face.

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Possibly Schellhas' remark that this god is one of the most important in Maya mythology, of which one we are at present ignorant, may be the most conservative. I hope later to discuss the symbolism of this figure at length, but can here devote only a word to it. In one of the figures of Codex Cortesianus a symbolic head of the God "C" is represented with a radiating halo about it, recalling what is known of sun feathers or rays in the symbolism of some other people. If this is a sun deity (Kinchauhau), the fact that the symbolism can be analyzed into a serpent, as Seler has so ingeniously suggested, would not be out of harmony. The connection of sun and serpent symbolism is intimate.

The clever supposition that the four Maya world quarters or cardinal points are represented by the signs on the four sides of the Tableau des Bacab, as pointed out by Rosny, Schellhas, Seler, Thomas, and others, has perhaps come to be recognized well grounded enough for science, although the authorities are certainly not in harmony in regard to the determination of the respective signs. The weight of argument at present would assign a hieroglyph over the God of Death in the tableau to the north world-quarter. We are justified in following a sinistral circuit in the consideration of the other signs, and following this we have the representative signs in turn west, south, and east. Seler has given good reasons to accept this assignment, the great objection to which seems to be that by considering the sign which he calls east we start at the bottom of the page instead of the top, or, if we reverse the page, we stand the central figures in an unnatural position. There is likewise evidence that the quadrant east is properly assigned and its symbol rightly determined, from the fact that the rows of day dots begin in that world-quarter in the tableau with *ymix*, which begins the series of day signs elsewhere in Codex Cortesianus.

Recognizing, therefore, that these signs are world-quarter symbols, and that they are probably rightly distributed, we find that over four almost identical figures of the Long-nosed God (19, 20, 21, a*), placed one after the other, the four world-quarter symbols occur in the same sequence as by following the sinistral circuit of the Tableau des Bacab. In each instance the world-quarter symbol is accompanied by that of the Long-nosed God. It is proper to assume that the four world-quarter symbols refer

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to the Long-nosed God: theoretically it is possible that the combination was intended to represent the Long-nosed God of East, North, West, and South. There is no authority, no direct evidence, and other explanations may be more significant, but certainly this has an element of truth from the comparative side: four Rain Gods, one behind another, with the symbols of four world-quarters above them, represent the four Rain Gods of the world-quarters. Among the Tusayan Indians there is a Rain God for each cardinal point.

The association of the snake with the Long-nosed God is not without a parallel among the Tusayan pueblo peoples, where the plumed serpent is the pet (*pó'-ke-mai*) or servant of *Ó-mow-úh*, the Rain God. If the four figures (19, 20, 21, a*) represent the Long-nosed Gods of the four cardinal points, with their accompanying pets, we would have a true Pueblo conception.

The fact, however, that each of these serpents has the body in a quadrate figure enclosing falling water, in which is the numerical sign for eighteen (three bars and three dots), is important, and each may represent an epoch of time, for such a method is common in Nahuatl representations. (See Clavijero's figure of Calendar, p. 265.) I would not say that the latter conception was not in the mind of the delineator, but it seems more natural to refer these figures to the cardinal world-quarters. This would not prevent our accepting the idea, however, that four series, one for each cardinal world-quarter, were also intended.

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MIGRATION AND THE FOOD QUEST: A STUDY IN THE PEOPLING OF AMERICA.

BY OTIS TUFTON MASON.

The Struggle for Existence.

In the struggle for existence our race has waged a double contest, the one against decay, disintegration within the human body or the society; the other against destructive forces from without.

The chief contest for the inner man has been to appease the insatiable cravings of *hunger* and *thirst*.

The chief contest for the outer man has been to resist the blistering rays of the sun, the biting frost, the pelting storm, savage beasts, and still more savage men. For this latter contest men created clothing for the body, the home for the family, the camp for the clan, the fortress and armor and weapons against the beasts and the enemy.

The elements of activity in this double contest were:

1. The exploitation of the earth for materials.
2. The transformations of these materials.
3. Transportation and conveyance.
4. Barter, commerce, and exchange.
5. The arts of consumption.

The activities just mentioned divide themselves into two sorts with relation to place—the stationary industries and the migratory activities. We shall attend now only to the latter.

Migration and its Motives.

By migration is meant intentionally or unintentionally leaving a spot and not returning to it. This term is frequently confounded with those movements throughout the year which have been called "the circle of activities," the ground covered being the sphere of influence or total culture area. This sort of orbital or annual movement has had much to do with those permanent migrations of which we are now speaking.

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The law of the circle of employments and of permanent migration may be called *the maxima and minima of effort*—that is, men have always bestirred themselves the year round and moved about the world on lines and to places where there seemed to be promise of the greatest bodily comfort and security for the least effort.

In this paper especial attention will be paid to this maxima and minima in relation to the food quest, though it will be seen that following this line conducts also to the best results in the other activities mentioned.

Migration is caused not by one motive, but by all possible motives. Collect all the influences that have actuated individuals in doing anything. These same, acting on a man, a family, a set of men, a horde, a clan, a people, have caused migration. They have acted by compulsion and by attraction, from within and from without, through nature and through man.

Taking these motives for change of habitation all in all, they may be sharply divided into two classes, the attractive and the repulsive forces. Some migrants are drawn, allured, enticed to move. They go because they want to; nobody compels them. They have in themselves the energy, the ambition, the vigor to go, and these are the peoples that have dominated the earth.

Other migrants are crowded, driven, compelled to move. They are afraid to stay where they are. Such people are cowardly, retrogressive, dying out. They shrink into the suburbs of the world. Uniting these concepts of attraction and compulsion with the notion of subjective and objective causes of struggle we have a quadruple set of migratory forces:

A. Subjective motives, *vis ab infra.*

1. Desire, hope, appetite, ambition.
2. Weakness, fear, aversion, cowardice.

B. Objective motives, *vis ab extra.*

3. Advantages, supplies, comforts, satisfactions, acting *a fronte* or *a tergo.*
4. Discomforts, compulsions, failure of resources, *a fronte* or *a tergo.*

Accidents, superstition, calamities play their part with substantial causes in this composite set of motives.

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In mechanics, bodies move in the lines of least resistance, with momentum proportioned to the *vis a tergo*. They have no souls, no desires; they do not move, but are moved.

With animals and men the case is different. They move in a parallelogram of forces.

1. In the lines of least resistance in front.
2. In the lines of greatest pressure behind.
3. In the lines of greatest desire within.
4. In the lines of greatest pull, or attraction, or supply from without.
5. In the lines of greatest effort, subjectively viewed.

After all, it is the cheerful, hopeful migration, stimulated by desire and encouraged by propitious surroundings, allurements, and forces, that effects new cultures. Doubtless shipwrecked mariners, lost wanderers, and outcasts have now and then left a happy thought or suggestion upon receptive aboriginal minds; but these random surf-beats are not what Tennyson calls

"The great waves that echo round the world."

Food Areas and Food Supply.

The greater part of the earth's surface was sterile and repellent to primitive man or to the living forms upon which he depended, to wit:

The deep sea, out of sight of coastal plains and meadows.
The arid deserts, sterile to man and plant and beast.
The mountain tops, then as now, inaccessible and repellent.
The frigid zones, above the lines of food and furs.
The great plains and prairies, away from water-ways.
The dense forests, jungles, tundras, and swamps.

Both he and his purveyors had to walk in those terrestrial paths which had been marked out by Nature and provisioned for his journeys. By following the trails of life he got into the green pastures and encamped by the still waters that invigorated his soul. It so happened that the trade winds and gulf streams were conterminous with the marine feeding grounds; that the inland rivers, bays, and lakes on which he could journey with greatest facility were the catchment basins of surrounding fertile lands and the feeding ground of innumerable creatures yielding food.

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The rich meadows and valleys were the débris of degradation. Their loam was once on the inaccessible tops of mountains and was only halting a little way on its journey to the great littoral feeding grounds. It was on this stream of dry land that great herds of ruminants were developed, and to them early men were attracted for the easiest and most abundant means of support.

The greatest natural food supply for the least effort, with few exceptions, was in the water. This saying is true for all the five elements of activity of which I have spoken previously, to wit:

1. *Exploitation.*—The easiest food to take for human aliment is in the waters.

2. *Transformations.*—The early manufactures, arts, industries, and division of labor over the products of the sea are more varied than those of hunting or gleaning.

3. *Transportation.*—By far the easiest primitive conveyance of man and transportation for the products of his activities was by water, and even now it is the cheapest.

4. *Barter.*—The oldest form of money, the world over, is shells from the water.

5. *Consumption.*—The preparation and serving of sea-food, in variety, in persistence throughout the year, in relation to cooking, drying, salting, and smoking, answer the demands of human desire as well as either of the others mentioned.

*Food and Migrations in America.

In the North American Review of October, 1869, and January, 1870, the Hon. Lewis H. Morgan wrote upon Indian migrations over the continent of America as influenced by existing physical conditions, principally food supply. Because the region about the mouth of the Columbia river was possessed of the most abundant materials of this character, Mr. Morgan made that the starting point of migration over the continent and worked out a scheme for the movements of the principal stocks of aborigines.*

I propose to take up the investigation of the distinguished ethnologist by the aid of such new light as the studies of twenty-

*Payne, in his History of America, claims to be the first to have hit upon this food quest as the chief motive in these migrations, but the North American Review had evidently anticipated him. Consult also Ward's Dynamic Sociology.

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five years have acquired. At present we may leave the question of the spread of stocks in America to the eminent gentlemen of the Bureau of Ethnology and to other scholars who are on the list of honorary members of our Anthropological Society, and inquire whether there be a practicable route from Indo-Malaysia to the Columbia river or to any other point near by on the north Pacific coast.

The Roads to America.

There are two possible routes from Asia to America, one of which has been often discussed; the other is, so far as I am aware, to be now for the first time proposed.

The first mentioned is the arctic or hyperborean route, across that culture region or oikoumenē, which I have elsewhere denominated the interhemispheric area. It is the land of snow and snow-shoes, fur clothing, marine and arctic mammal food, underground dwelling, birch trees and the arts springing therefrom, skin and bark boats, harpoons, sledges, all the way from east Greenland to the Land of the Midnight Sun, in Norway. This might be called the land route.

The route which I now propose might have been nearly all the way by sea. It could have been a continuously used route for centuries. Until interrupted by later civilizations, it might have been traveled over for thousands of years. It lies absolutely along a great circle of the earth, the shortest and easiest highway upon a globe.*

A Hypothetical Case.

The Haida Indians of British Columbia annually voyage as many as five hundred miles southward to Puget sound to lay in a supply of dried clams and oysters for their own consumption and for trade.

Let us imagine a company of their ancestors, no matter how many centuries ago, setting out from the Indian ocean in an open boat no better than the one they now employ, and governed

*I omit here the supposed route from Europe to Greenland, because it demands certain geological changes, all of which the writer is now trying to avoid; also those lines straight across the parallels from Polynesia, because the food supply was inadequate, and for other reasons.

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by the same motives that have always and everywhere impelled men of their grade.

In order to make the problem of their voyaging as simple as possible, let us not imagine any submergence of the ocean bed nor any geological nor physiographical changes, nor any accidents out of the daily human experience. We may be allowed to restore to the waters and to the land such creatures as we know to have been destroyed out of them in recent centuries by the exigencies of enormously multiplied populations and the demands of modern commerce, but no more. It will make our inquiry much simpler if we have no experiences introduced or imagined that any man may not repeat at his leisure.

The separate marine enclosures or areas in the progress of a migration from the Indian ocean to the Columbia river, along a great circle of the earth, are:

1. The northeastern Indo-Malayan archipelago.
2. The south China and Malay seas.
3. The east China and Yellow seas.
4. The Japanese and Tartary seas.
5. The Okhotsk sea and environs.
6. The Bering sea with its bays.
7. The Alaskan sea and inlets.
8. The Tlinget-Haida sea.
9. The Vancouver sea.
10. The Columbia basin.

This same great circle would go on to include the headwaters of all the Rocky Mountain streams, the Great Interior basin, the Pueblo region, Mexico, Central America, Ecuador, and Peru.

Necessary Conditions.

The conditions into which the student would be bound to inquire would be the following:

1. *Food Supply.*—Could our imaginary Haida crew of men and women travel, say, from the Andaman and Nicobar islands to the Columbia river, a distance of ten thousand miles, and live on the natural resources all the way? Are the situations and movements of this food supply such as to toll or invite wandering peoples steadily and continuously onward.

2. *Conveyance.*—Were the means of conveyance in vogue in the

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Malayo-Polynesian area adequate to such a journey? Could the modern Haida great canoe, the East Indian or the Malayo-Polynesian craft stand such a trip? Are there land-locked seas all the way, such as East Indians, Malays, and Haidas paddle in at home, at the present moment? Had either people, before contact with whites, the appliances and the skill for such an excursion?

3. *Currents and Highways.*—In which direction do the ocean currents move along the route indicated—toward America or from America?

4. *Winds and Temperature.*—What winds blow along the Asiatic coast, about Bering sea, and the archipelagos of the northwest American coast? What is the effect on the atmosphere of the winds which blow from these currents and from the tropics in respect of climate in the countries along the route? Would these winds gradually move peoples toward or away from America? If a boat without a crew were set adrift in the South China sea, to what point would it drift? What series of isotherms are included in this area?

5. *Suggestions and Barriers.*—Are there any insurmountable barriers to our Haida Indians or Malays—that is, what would be the most difficult places for them to pass by reason of distance from land to land, exposure to open sea or adverse winds, failure of provisions, or greater allurements in other directions?

6. *Blood.*—Admitting that the aborigines of America are from the eastern continent, what peoples of the Old World are most like those of the New, anatomically and anthropometrically, by which is meant in skeleton, in muscular development, height, weight, physiognomy, color of the hair, eyes, skin, etc.?

7. *Social Structure.*—The aborigines of the western continent had a social structure built up on the gentile system, practicing endogamy as regards the tribe and exogamy as regards the clan. Now, should our Haida Indians find any peoples about the Indian ocean who had the very same or nearly the same social structure?

8. *Language.*—What testimony does language bear to the kinship of American aborigines with Eastern peoples? To what languages in the Eastern Continent are the American tongues nearest akin?

9. *Arts.*—In the arts of practical life and the arts of pleasure what similarities should our company of Haida Indians find?

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It is freely admitted that similarities arise in these respects by stress of the earth and stress of a common brotherhood of man; but such similarities are more or less functional or general or superficial. The more that things or customs agree in minute structure, the more specifically are they akin and have had the self-same originators. In other words, the greater the similarity, the less the probability of diverse origins. Are there any arts so akin structurally as to make the theory of independent origin improbable?

10. *Remains and Historic Evidence.*—What relics of primitive occupation should our voyagers encounter that would remind them of home, and what testimony have we of such aboriginal peoples? Or, to put the question in another form, if one of our distinguished archeologists, Morse or Putnam or Holmes, or a historian, such as Brinton, made the journey with the Haidas, would he come across any shell-heaps, abandoned dwelling sites or work places, or ancient documents entirely inexplicable by the present inhabitants, but quite plain to one skilled in the antiquities of our own continent?

11. *Religion and Folk-lore.*—What is the testimony of comparative mythology concerning the inhabitants of the spirit world and their conduct as believed in throughout the several neritic areas mentioned? In the cult of these regions what similarities exist in sacred places, houses, images, and worships? What folk-customs seem to be akin?

12. *Modern Witnesses.*—Not only trained ethnologists but naval officers, navigators, travelers, and missionaries are constantly testifying and declaring their convictions of the commerce and blood relationship between the two sides of the Pacific. Any one of these witnesses might be entirely inadequate; but what weight is to be given to the cumulative testimony?

In brief, the conditions demanded are the following:

1. Abundant food supply.
2. Easy transportation and conveyance.
3. Oceanic currents and highways.
4. Favoring winds and temperature.
5. Encouragements rather than discouragements, invitations and not barriers.
6. Ethnic kinships.
7. Similarities in social structures and functions depending on kinship.

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8. Affiliations in language.
9. Similarities in arts otherwise inexplicable.
10. The favorable witness of archeology and history.
11. The same traditions, folk-lore, mythology, and cults.
12. The confirmatory testimony of ethnographers, travelers, observers, etc.

Let us examine them in order.

A Definite Proposition.

In order to test the foregoing questions the following concrete hypothesis is advanced for examination:

During the centuries in which Europe was working out of her earliest stone age into her renaissance, certainly for three thousand years or more America was being steadily and continuously peopled from Asia by way of its eastern shores and seas from the Indian ocean. Subsidiary movements in the way of offshoots from this migration, contributions to it and barriers to its progress took place up and down the rivers and in the seas of India, China, Mongolia, and Siberia.

I. Abundance of Food.

In each of the areas mentioned there were a great number of species of food plants and animals, the individuals of many species were of great size, and of all the species there was prodigal quantity.

In the Indian ocean and south China seas the animals are tropical and the natives are expert in their capture.

In East China sea and Japan sea are inexhaustible supplies of shad, herring, mackerel, cod, and local species. Besides these, food plants, water fowl and marine invertebrates still abound for every need of the people.

Before the Russians began their operations in northeastern Asia the peninsula of Kamtschatka supported sixty thousand inhabitants; but under their rule the using up of the food supply and the introduction of fatal diseases decimated that number. At the present time the sea of Okhotsk would yield salmon and other aquatic food in abundance for any aboriginal needs; and prior to one hundred and fifty years ago the Rhytina afforded the absolute maximum of aliment for the least effort. There was also no limit to subsistence in Bering sea. Further-

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more, no sooner do we approach the latitude where the rigors of the climate demand extra clothing and fuel for the body than we find marine mammals and land mammals superabounding. Whale, seal, walrus, and sea-lion in the water, and elk and reindeer and bears on land, are even more serviceable than the fish, for they are house and furnace and clothing and food, all in one. In no region of the world do food-fishes and land and sea mammals exist so abundantly and so accessibly.*

II. The Naval Possibilities.

To investigate the second topic, namely, the possibilities of such a voyage or journey with the appliances at hand, it will be necessary to inquire as to—

1. Its length and directness.
2. The quality of the ships.
3. The ability of the mariners.
4. The depth of water.
5. Whether the environment is such as savages are accustomed to.

1. All modern steamships travel on the great circles of the earth as the shortest distance between two points. The Canadian Pacific steamers skirt the Aleutian chain on the way to Victoria from Yokohama. A great circle of the earth between the Straits of Malacca and the Columbia mouth passes through every one of the shallow food-stocked areas named, and, continuing onward, is in touch with the buffalo feeding grounds at the sources of the great rivers, with the pueblo region, Mexico and Central America, and the highlands of Peru and Ecuador. The Aztecs, Mayas, Chibchas, and Kechuas were the antipodes of the ancient inhabitants of the Malay archipelago.

2. As for the ships, it will be admitted that the aborigines of this continent were possessed of every form of boat known in the eastern continent except the outrigger canoe—kaiak, umiak, pirogue, bark canoe, coracle, skin float, raft, and reed float. They were singularly poor in appliances for land travel south of the dog and snow line; indeed, they kept to the waters

*Consult U. S. Nat. Museum Bulletins of London Fisheries Commission; Reports, &c., U. S. Fish Commission; Report Japanese Commission, World's Columbian Exposition. The writer acknowledges his obligations to Dr. G. Brown Goode and Dr. Tarleton H. Bean.

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closely. By a system of portages they had connected the Arctic ocean with the Atlantic and the Gulf of Mexico.

Upon the Asiatic side the aborigines have been removed by Russians, Japanese, and Chinese; but in the Malay peninsula are craft as varied and as effectual, and the lines of the vessels are strikingly like to those of our western coast.

3. When Europeans visited the Indian ocean and the Pacific these waters were covered with hardy navigators. I am even tempted to suggest that the turning aside of a stream of pre-Malays, who were the Phœnicians of the Orient, by the Mongoloid intrusion from inland led to the peopling of the archipelagos of the Pacific after America was fairly settled and the northward migration was interrupted.

4. All the way from the Straits settlements to Vancouver, as will be seen by the *Challenger* map and the British Admiralty charts, we have shallow water. There is a broad bench constituting the marine feeding ground, where the series of outlying islands and archipelagos fence in the neritic areas. The conditions are perfect.

5. Each one of these environments is within the capabilities of savages. The land-marks were their light-houses; the inlets were their harbors innumerable; the grass and the color of the water were their barometers; the mammals, fishes, and birds were their pilots. They were scarcely subjected to the terrors and dangers of the fathomless sea.*

III. Ocean Currents and Food Supply.

In following this line of enormous food supply our voyagers would be materially aided by the ocean currents. The equatorial stream of the Pacific flows westward between the tropic of Cancer and the Micronesian archipelagos. On reaching the South China sea it is split, a part going southward and westward into the Indian ocean and a part northward and eastward, like our Gulf Stream, skirting the outer rim of the seas that I have mentioned all the way to the Columbia river. Within these seas counter-currents and eddies help to equalize the

* For the annual journey of the fur-seals (*Otariidæ*) from the Antarctic continent across the equator and over this very same great circle as far as San Francisco bay, see E.-L. Trouessart: Compt. Rend. Acad. Sc., Paris, 1881, vol. xcii.

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temperature of the adjacent lands. The effect of this Kurosiwa, as the ocean current is called, is much greater upon the food supply than upon the people. Bringing millions of tons of tropical silt and low sea forms in its stream, this Nile of the Pacific deposited them over the bed of the land-locked areas, acting like a top dressing upon soil and feeder of the aquatic food fauna. The lowering of temperature northward naturally gave the migrants an increased advantage in life's struggles as the climate became more stimulating, fecundating, and strengthening.

IV. Prevailing Winds and Food.

As for the prevailing winds, the trades blow westward in the tropics. On reaching the Pacific shore they would follow some such law as that of the waters, but during the months of May to October the simoon from the Indian ocean pushes northeastward and drives the trades along Asia northeastward. As we proceed, the ocean current is spread out, and the winds blowing from warmer latitudes exert their benign influences on the coast of southeast Alaska, British Columbia, and the State of Washington. The temperature of the whole route is equalized.*

*1. The annual isotherm —20° to —10° Cent., I shall call the Arctic area. It includes (1) Arctic America, sweeping below the circle at Hudson bay; (2) Greenland above 75° north; (3) Arctic Asia and sweeps down to Jakutsk in Siberia.

2. The annual isotherm —10° to 0° Cent., including Alaska south of the Strait, northern Canada, southern Greenland, Lapland, northern Russia, the northern Altaian piedmont, Okhotsk sea, Kamchatka. It is the Interhemispheric ethnic area.

3. The annual isotherm 0° to + 10° Cent., including southeast Alaska, British Columbia, southern Canada to New York, southern tip of Greenland, middle or blonde Europe, Mongoloid Asia, northern Japan, southern Saghalien, southern Kamchatka.

4. 10° to 20° Cent., United States, temperature rising west to Rockies by long curve and then southward by precipitous curve; Mediterranean or Melanchroic Europe, central Asia, China, and Japan.

5. 20° to 30° Cent., the tropical world, Interior basin of the United States, northern Africa, Mesopotamia, Afghanistan, India, Farther India.

The summer temperature of the Yukon region is that of Saghalien, Corea, Japan, and China.

The isobar of Hong Kong passes along Japanese isles, around the shore of Okhotsk sea, across Bering strait, and crosses America just north of Vancouver.

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V. Encouragements and Discouragements.

Morgan says that barbarians, ignorant of agriculture and depending upon fish and game for subsistence, spread over large areas with great rapidity. Under the operations of purely physical causes they would reach in their migrations the remotest boundaries of a continent in a much shorter time than a civilized people, with all the appliances of civilization.*

The same is true of the seas so long as they are unimpeded. Even after that new peoples constantly wedge themselves in, as they have done in Columbia, Washington, Oregon, and California.

Two things would modify the track of migration which we are discussing, to wit:

1. The intrusion into the neritic areas along the Asiatic side of peoples that were sedentary and who assumed ownership of them, turning the highways into possessions and blocking further progress of migration. This intrusion ended at the north with Russia and the United States, 1728–1894. The white race in 1498 first set its greedy eyes upon the east, and Magellan died on the Philippines in 1521.

2. The intrusion into the stream of northeast movement of foreign elements. To continue the figure of the Haida voyagers, supposing they had replaced as they went from sea to sea any who died, whether men or women, with recruits from the shore. In a long voyage the complexion of the crew on arriving at Victoria would be greatly modified; also they may have left at the mouth of the Canton, Yang tse, Yellow, and Amoor river one or more pairs of their passengers. All of these things would have been perfectly natural to do.

But supposing that instead of a single canoe-load of fifty Indians there were a stream of canoe-loads flowing for thousands of years, when the east part of Asia was like the west coast of America fifty years ago; then colonies would be dropped in every favorable place and the peopling of eastern Asia would go on from the sea up the rivers and not from the land down the rivers. These peoplings may be described as waves, and we should speak of—

1. The American wave leaving the Japanese shell-heaps.

* Morgan in Beach's Ind. Miscel., 159.

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2. Eskimo, Aleut, Jenessai, Ostyak wave.

3. Hyperborean Asiatic wave, peopling Siberia.

4. Aino wave, quite as likely to have followed our route as any other.

5. Mongoloid waves from inland seaward, ending in permanent industrial settlements and the cessation of migrating.

Imagine eastern Asia at the beginning of our era, or a thousand years before that, the abode of teeming populations of aborigines, living, moving, trading along these land-locked highways abundantly provided with food. They were fishers and hunters. Contemporaneously, in the Nile valley, in Syria and Mesopotamia, in China and India, cereal, pastoral, and mechanical industries have been developing. Many of the peoples practicing them push to the east; they divide the coast. The aborigines disappear; they leave their shell-heaps and move northward, then eastward and westward, following the winds and currents, and take the shortest and most inviting path onward.

There came to the eastern side of America three hundred years ago the nations of Europe. They crossed the continent and circumnavigated it. They cut in two our aboriginal Pacific coast culture in many places.

1. The Russians in Bering sea nearly severed the native commerce of the two hemispheres.

2. The Hudson Bay Company enlisted the movements of the Indians in their behalf and destroyed the aboriginal migrations and commerce.

3. The American fur traders projected their operations between the stocks of Oregon and California.

4. These were followed by explorers, settlers, and miners in our century.

5. The transcontinental railroads and the creation of independent states obliterated all vestiges of former aboriginal movements.

VI. The Race Problem.

The opinion of such scholars as Morgan and Brinton as to the uniqueness and homogeneity of an American race is not gainsayed. It cannot be denied, however, that this race is a mixed one fundamentally, and that there enter into it varied anthropometric characters. This is not only true of the living tribes but

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of the bones from the graves. It has even been averred that Polynesians may have crossed from the Pacific archipelagos, moved northward and mixed with long-headed northerners, forming a mesocephalic type.

Now I would solve these mysteries in a different way: Following the most abundant food supply along the seas in which primitive men were best equipped to obtain it, following currents of earth forces that would furnish incitement and even motive power, the ancestors of Malays, Polynesians, and Indians came from the equator to America. They traversed for nearly the entire distance a series of land-locked seas of shallow water, abounding in food supply of fish and birds and marine invertebrates, and part of the way with innumerable vertebrates, as we have seen.*

As to cranial index, the Eskimo are among the longest-headed peoples of the world, ranking with Abyssinians, Caroline islanders, Hottentots, and some Polynesians. Most Americans are mesocephalic, as are the Malayo-Polynesians, but the northern Mongoloids are the shortest-headed people in the world. In nasal index Topinard places the Redskins next to the yellow races of Asia, and in his general scheme the Redskins follow the Polynesians.

VII. The Problems of Sociology.

All the tribes in America except the Eskimo were found living under a peculiar system of relationship. Each tribe was endogamous, but it was split into gentes that were exogamous. Connected with this was a system of classific relationship, descent in the female line, and other social and political regulations that were new to the explorers. Morgan found that each great ethnic group had its own marital and political system, and these he has classified in his monumental work. He says: "The system of the Seneca-Iroquois Indians of New York is identical, not only in radical characteristics, but also in the greater portion of its minute details, with that of the Tamil people of south India."

*For a résumé of modern schemes of mankind, see the author's "Accounts of Progress," in Smithson. Ann. Rep., 1885 to 1893. The writer does not now discuss the pristine home of the human species.

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VIII. American and Asiatic Languages.

I shall not here discuss the question of language. The peculiar family system of the American aborigines, restricting marriage in the tribe, was more conducive to the rapid multiplication of languages than any other that could be devised. In that dispersive, centrifugal period of human history which preceded the invention of a written language changes must have gone on rapidly. Furthermore, philologists have not had the material upon which to work in forming a solid theory of linguistic relationships, and the latest researches do not justify the assertion that the American languages stand alone in morphology.

While is it true that identity of language is a good proof of the kinship of peoples, in the present state of knowledge the lack of proof of identity is no disproof of relationship in times remote or proof of non-relationship by consanguinity or contact.

IX. Similarities in Arts.

To elucidate the whole subject of similarities in arts along the two shores would consume too much time. The writer will sufficiently orient himself in the minds of his readers by saying that there was scarcely an original idea developed upon the western hemisphere. Every one of the industrial and esthetic arts here can be exactly matched by one from Asia or Oceanica. Many American arts also tally with those of prehistoric Europe, but these also came from that common ancestral source that supplied both Europe and Asia and America.*

There is nothing unnatural or improbable in the supposition that the original migrants to a country should lay aside an art on the way and pick it up again in succeeding generations. This does not controvert Tylor's proposition that a people that has acquired an art never loses it. I am now speaking of a stream of migration starting out from the equator and passing northward out of one culture area of mineral, vegetal, and animal supply, and of aërial, marine, and terrestrial conditions, and moving northward into and through a series of different sup-

*As one of many hundreds of examples of similarities consult Tylor on the game of Patolli, J. Anthrop. Inst., Lond., viii, and Culin and Cushing on American and Asiatic Games, unpublished.

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plies and conditions as far as there is a motive, and then repeating the process southward on another continent. This would require centuries. In one region a peculiar exigency evokes the art of working in hard stone; in a series of regions beyond, the absence of material, or of the proper tools, or of a demand for the product, interrupts or converts this art into something else. By-and-by the descendants of this people come upon new quarries, demands, and appliances. The art breaks forth again in such striking similarity as to raise the inquiry among ethnologists whether some unfortunate castaway may not have been thrust ashore here and taught all the people a foreign art. This is highly improbable. The naturalists have no difficulty of accounting for such occurrences in nature, and they call them atavism. Technical atavism, then, may account for the recurrence of some ancient Malayo-Polynesian arts in America.

X. The Witness of Archeology.

Archeology has begun to bear testimony upon these possible migrations. Morse discovered shell-heaps in Japan, and his researches were followed up by Kanda upon the stone implements. The ancient Japanese stone implements are identical with the American in technique and strikingly similar in shape. Even the esthetic forms are wrought in precisely the same manner. It is well known that several waves of aboriginal occupation preceded the present Mongol dynasty in China, and students are waiting with interest to know more about them and the paths by which they entered the celestial domain.

XI. Religion and Folk-lore.

I think that all American myths point to northern origin. They are filled with stories of the sea; but there is little ground now in the infancy of the science of folk-lore and mythology upon which to build theories.

I mention in passing the Easter Island images, the New Zealand and other Polynesian wood carvings, and the general suggestion of the northwest totem devices in the Japanese areas.*

*Consult J. G. Frazer, Totemism, Edinb., 1887, Black.

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Boas, who has studied the west coast myths more than any one else, points to their Asiatic origin.

XII. The Testimony of Ethnographers and Others.

Finally, and I do not think that such cumulative evidence is to be despised, all intelligent travelers are struck with the similarities existing between our west coast Indians and existing eastern Asiatics. It is true that those who have noted these resemblances have resorted to absurd theories to account for them; but false theory and good empiric results are not incompatible. It is well known that our Eskimo have peopled a portion of northeastern Asia, following the dominating instinct for aliment and comfort. The proposition I wish to defend is that this close connection between the two continents has existed for thousands of years, during which the contact between western America and eastern Asia was more and more close and extended and unbroken as we proceed backward in time. Or, to put the matter in another shape, there never was known to history a day when the two continents were not intimately associated. The evidences of the past seem to confirm the opinion that as we go backward in time the geographic conditions were more favorable and the contact more intimate. In conclusion, the author has not here undertaken to do more than to clear the way for a specific study of the civilizations of America and those of the Indian ocean. He disclaims any reliance upon continents that have disappeared, upon voyages across the profound sea without food or motive, the accidental stranding of junks, or the aimless wandering of lost tribes. When the continent of America was peopled, it was done by men and women purposely engaged in what all sensible people are now doing, namely, trying to get all the enjoyment possible out of life for their efforts.

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THE PAPAGO OF ARIZONA AND SONORA.

BY D. D. GAILLARD, U. S. A.

The country over which the Papago roam is roughly bounded in the United States by the Santa Cruz river on the east, the international boundary line between Nogales and the 114th degree of longitude on the south, the 114th degree of longitude on the west, and the Southern Pacific railroad on the north. In Mexico they occupy an equal area, lying south and southwest of that just described and extending to the Gulf of California. The "Wild Papagos" roam principally between the Baboquivari and Ajo mountains and within 40 or 50 miles north and south of the international boundary line.

In this region, wherever water can be obtained perennially, they have their permanent rancherias, the houses being sometimes of adobe, sometimes of upright poles plastered with mud, and sometimes of poles planted in the ground, the tops drawn to the center and fastened, and the whole beehive-like structure then thatched. The houses generally have but a single entrance, facing the east. This entire region is a hopeless desert, and few if any Americans reside in it. It is unadapted for agriculture, yet when the July rains commence the Indians forsake their rancherias and hasten to their *temporales*, where they plant crops of corn, pumpkins, melons, squashes, etc., which they irrigate by means of water drawn from natural or artificial dams (*charcos* and *represos* respectively). These crops mature rapidly and are generally harvested before the water entirely disappears.

During the rest of the year the Indians devote themselves to the care of their herds of horses and cattle, of which they possess quite a number, and to the gathering of the fruit of the cactus, mesquite beans, and the bean of the *palo fiero* or ironwood.

All attempts to ascertain approximately the total number of Papagos in the United States and Mexico have been discouraging, the estimates varying from 2,000 to 5,000 in the United States, but nearly all agree that about an equal number reside in Mexico. According to the census of 1890 that portion of the tribe residing in the United States numbers 5,113.

In Mexico they have a "governor" appointed by the governor of Sonora, while each rancheria chooses its own headman, who

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directs local affairs, but is subject to the "governor." The latter visits each rancheria at least once a year. In the United States each rancheria also has its headman, but further than this I could ascertain nothing regarding the local government of this people. It may be well to call attention to the great difficulty of obtaining reliable information regarding the "Wild Papagos," as I met no Americans in their country, no Mexicans who could speak Papago, and no Papagos who could speak English and very few who could speak Spanish; so while I have tried to be accurate, due allowance must be made for a possibility of error caused by unfamiliarity, both on the part of the Papagos and myself, with our only medium of conversation, the Mexican language.

Each family has its own name, as *Los Gatos* (the cats), *Los Cochinos* (the pigs), *Los Cachuchas* (the caps), *Los Melones* (the melons), etc. Their manufactures consist of ollas or water jars and cooking vessels of pottery of excellent quality and of a dark-red color with black markings. I have never observed any cream-colored pottery, like that common among the Pimas and Maricopas. The making of baskets of a fine weave like the Pima baskets is almost unknown; but at Poso Verde, Sonora, I saw a few made at that place and observed that the weave differed slightly from that of the Pimas, as did also the patterns and colors (a reddish brown and white), but as they were all made in one place, this may have been purely a local peculiarity. These baskets are water-tight. They also make very pretty *kihos*, a kind of dipnet-like arrangement, made of dyed fiber, and mounted between four sticks. The *kiho* rests on a squaw's back, and has a strap which comes over the forehead and helps support the weight of its contents, which may be a baby, a few ollas, a load of hay or wood, or the household effects on a move.

Marriage seems to be lightly esteemed by the Papago, the wife being changed at pleasure, but generally presented with horses and cattle to help support the children, whom she retains.

The dead are buried in caves, when they can be found, but if no caves are available they build a round wall of stone about three feet high and four to six feet in diameter, in which the body is placed. The top of the structure is then covered with poles, on which heavy stones are closely laid. At the grave the horse of the deceased is killed, and with the body is placed his personal property—saddle, bridle, spurs, gun, etc.—that he may have them in the hereafter.

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They do not seem to believe in any God, but attribute all that happens to the action of spirits, generally evil spirits, and go through many dances and incantations to banish these daimons.

They have three dances still quite generally participated in by all rancherias near the international boundary line. The first, known as the *huaca*, lasts for two or three nights, and celebrates the arrival of a young girl at the age of puberty. Another, known in Spanish as the *baile del buro* (dance of the deer), takes place early in July and is held for the purpose of calling down rain. A deer's head is mounted on a pole and its flesh is placed underneath. The dancers consist of young unmarried boys and girls, who form a line, taking places alternately, and face the rising moon. They then begin singing and dancing, always keeping the line facing the moon until the moon sets, when they plunge into a stream, take a bath, and have a feast.

The greatest dance of the year is held in the fall, at Quitobac, Sonora. This is a religious ceremony, in which the dancers follow the course of the sun and are attired in masks. At this dance they bring out their treasured *piedra que llora y canta* ("stone which weeps and sings"). No Americans or Mexicans are allowed to see this sacred stone, which is universally believed to be the altar-stone of the old mission church at Sonoyta, said to have been destroyed by Papagos. Whether or not the dance is wholly in honor of this stone I have been unable to learn.

From Don Pedro Aguirre of this place, who has travelled much among the Papagos, I learned the following details of a scalp dance performed by them at San Ignacio, Magdalena, Mexico, about twenty-five years ago. A war party of Papagos had been out against the Apaches, their hated foes, and one of the warriors had taken an Apache scalp. The Apaches were regarded as devils, consequently unclean, and on the return of the party this warrior was halted at some distance from the rancheria and required to fast for forty days, during which time a scant supply of food was handed him every day on a long pole. Day by day he approached nearer the rancheria, till the expiration of the forty days found him in it. He was then bound hand and foot and brought into one of the houses, where the Apache scalp was hung on a pole in the middle of the room. A grand dance around it then took place, and about midnight the warrior, bound as before, was seized by his hands and feet, carried to a neighboring ditch and thrown in the water; his

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bonds were cut, he was given a hearty meal and restored to his former standing, and thenceforth was a hero.

The Papagos say that they did not migrate from elsewhere, but have always lived in their present country.

They speak of having had two gods, whom they say were neighbors. One, whom they call Sĭ'-e-huh, they speak of as a God of War, who controls the summer rains. He formerly lived on Baboquivari peak (a very striking inaccessible eminence with vertical sides, in southern Pima county, Arizona), but has gone away and appears to have deserted them, except as regards rain, and in view of the three years of drought his efficiency even in this regard is questionable. Summer before last the inhabitants of the surrounding rancherias went in procession to the foot of Baboquivari, accompanied by their medicine-man. At dusk they halted, and during the night the medicine-man climbed to the summit of Baboquivari, it is said, though such a feat is impossible, and bathed in a *tinaja* of water, the overflow from which is supposed to have caused rain to fall in the vicinity.

The other god is "Moctezuma," whom they say used to live with them, but left them because some of his people were trying to kill him, and has gone over the sea toward "the rising sun," but will come again to right all wrong and lead his people to their former greatness. He is represented to be about the size of a child three or four years of age, to be of the same complexion as the darkest Papagos, and clothed in beautiful garments of painted buckskin. They say that he once lived in Casa Grande and thence went to Mexico, promising them he would return from the east at sunrise. That they may be ready for his coming, and that he may have no obstacle in his way, most of them build their houses with the entrance facing the east, and often now they gather to watch at sunrise for the coming of that "Moctezuma," who is sorely needed, since the drought of the last three years has prevented harvest at their temporales.*

This information regarding Sĭ'-e-huh and "Moctezuma" was obtained from Marmela, an old Papago woman of Poso Verde, Mexico.

*Compare the Pima god Sŏ'-hŏ, mentioned by Grossman in Smithsonian Rep. for 1871, p. 408. The "Moctezuma" belief had its origin in early Spanish teaching. See "The 'Montezuma' of the Pueblo Indians," by Ad. F. Bandelier, *American Anthropologist*, October, 1892.—*Editor.*

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DISTILLATION BY EARLY AMERICAN INDIANS.

BY CAPTAIN JOHN G. BOURKE, U. S. A.

In the Anthropologist for January, 1893, there was published a brief description of a visit made to Lake Patzcuaro, in the state of Michoacan, western Mexico, in which I commented upon some very primitive methods of distillation in use among the Tarasco Indians of that region.

In that article reference was made to the decidedly aboriginal type of the apparatus employed and to the fact that the natives of Mexico have for centuries been celebrated for their skill in making liquors from the maguey, nopal, mesquite, and maize. Most of these liquors are made by fermentation. Nevertheless, there seems to me to be much to support the idea that the American Indian—at least the Aztec—had some acquaintance with rude processes of distillation not taught him by the European.

The following quotations bear upon the drinks of the Indians as noted by the first discoverers.

Columbus observed that the Indians of Veragua, on the north coast of South America, not only used corn as food, but made of it a drink resembling English beer, with which they mixed various spices. This was the same as the tizwin of the Apaches of Arizona, who are so extremely fond of it that they ignore or defy all ordinances made for its suppression. Tizwin formerly figured prominently in all the Apache ceremonial dances and preparations for the warpath; so much so that twenty or twenty-five years ago, when officers learned that the Apaches were indulging in a "tizwin drunk" they knew that mischief was afoot. My own opinion, as expressed elsewhere, was that it was their sacred intoxicant.

Tizwin differs somewhat from the sour drink made by the Cherokees from corn-meal gruel and regarded by them as very palatable and refreshing in sultry weather.

Columbus describes not only tizwin, but also mescal, the favorite alcoholic stimulant of the Mexican Indians of today.

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It is now quite well understood that there are two classes of liquor obtained from the maguey, or American aloe. The sap, or "miel," when allowed to ferment becomes the beer-like "pulque," which is consumed in enormous quantities. The center stalk or heart of the plant, first baked and allowed to ferment and then distilled, furnishes "mescal." It was this latter which Columbus probably saw. It is expressly stated that the juice of the marrow of the trunk was *boiled* with water and spices. But we can let the life of Columbus supply the words:

"Se nourrissent de Maiz qui vient en épy comme du millet, et en font une liqueur semblable à la cervoise d'Angleterre, en y mêlant quelques épiceries qui luy donnent le goust du Rape. Ils en font une autre avec une sorte d'arbre plein de longues épines; ils prennent la mouelle du tronc, la pressent, et en expriment le suc qui ayant bouilly avec de l'eau et des épiceries, compose une boisson qu'ils estiment beaucoup." (Life of Columbus, by his son Fernando, Paris, 1571, second part, p. 197.)

Closely following Columbus came the Emperor Charles V, who spoke as follows of the Indians of New Spain (Mexico), within ten years after Cortez had made himself master of Tenochtitlan:

"The Indians of New Spain make use of a drink called pulque, which is distilled by the magueys, plants of great value for certain purposes, and when drunk in moderation its use may be tolerated, since they have always been accustomed to it; but it has been noted that great harm and danger have been occasioned by their manner of doctoring it by the introduction of various ingredients noxious to spiritual and temporal health, since, under pretense of preserving it and keeping it from corruption, they mix with it certain roots, boiling water, and lime, which impart so much additional strength that it deprives them of their senses, inflames the principal members of the body, sickens, stupefies, and kills them with the greatest facility, and, what is still more to be deplored, being thus alienated, they commit idolatries, return to the ceremonies and sacrifices of paganism, engage in furious altercations, deprive themselves of life, and commit many carnal, scandalous, and incestuous vices, for the suppression of which the ecclesiastical authorities have been compelled to fulminate censures."*

* "Usan los Indios de la Nueva España de una bebida, llamada pulque, que destilan los magueyes, plantas de much beneficio para diferentes effectos, y aunque bebida con templanza, se podria tolerar, porque ya estan acostumbrados à ella, se han experimentado notables daños, y perjuicios de la forma con que la confeccionan, introduciendole algunos

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This edict will bear a great deal of scrutiny. While the term "pulque" is used and the whole thing may be taken as an ordinance for the suppression of pulque debauches, yet the word "destilan" also appears, and may be translated "distilled by, or from, the magueys."

But it is to another statement that attention should be especially invited—the adulteration of this drink with lime-water and various noxious roots. The very same thing is done along the Rio Grande in Texas today. The mescal sold in the "cantinas" of the little towns in southern Texas, as well as in northern Mexico, is diluted with lime-water and has added to it several kinds of roots and berries, the most important being the chilchipin, said to be the basis of the fiery Tabasco sauce. If we admit that within less than ten years after the conquest of Mexico the Spaniards had taught the aborigines the secrets of distillation, then it is only fair that we should also concede that the Spaniards had familiarized themselves with roots and berries previously unknown to them and taught the natives to add them to the new beverages. The use of tizwin, pulque, or their analogue, beer, in sacred ceremonies was not confined to the New World.

Speaking of the labors of the Irish monks, Saints Gall and Columbanus, among the Teutons near the head of the Rhine and not far from Lake Zug, in Switzerland (about A. D. 590–610), Montalembert says: "Sometimes they broke the boilers in which the pagans prepared beer to offer as a sacrifice to Woden."*

ingredientes nocivos à la salud espiritual y temporal, pues con pretexto de conservarla, y que no se corrum pa, la mezcla con ciertas raizes, agua hirviendo, y cal; con que toma tanta fuerza, que les obliga à perder el sentido, abrasa los miembros principales del cuerpo, y los enferna, entorpece, y mata con grandisi ma ficilidad, y lo que mas es, estando enagenados, cometen idolatrias, hazen ceremonias, y sacrificios de la Gentilidad, y furiosos traban pendencias, y se quitan la vida, cometiendo muchos vicios carnales, nefandos, è incestuosos, con que han obligado à que los Prelados Ecclesiasticos fulminen censuras." (Law XXXVII, Charles V, Toledo, August 24th, 1529.) To be found in "Recopilacion de Leyes de los Reynos de las Indias," Madrid, 1681. Julian de Parédes. (Copy now in Newberry Library, Chicago.

*"Monks of the West," English edition, London, 1861, vol. 2, p. 430.

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THE CHINOOK JARGON.

BY MYRON EELLS.

No one person is competent to write a dictionary of the Chinook jargon, because it is so constantly changing and is used very differently at the same time in different localities. Words that are very common at one place are sometimes obsolete a hundred and fifty miles from that place, and words that have been adopted into the language from the English in one place are unknown to neighboring Indians.

In order to write a complete dictionary of the jargon, one should learn to speak it thoroughly in one place, then go to all the other places where it is spoken differently, and spend enough time at each place to note the differences. This would necessitate a residence in northern California, southern Oregon, the Willamette valley, eastern Oregon, northern Idaho, northeastern and middle Washington, Puget sound, several localities in British Columbia both east and west of the Cascade mountains, and several places in Alaska.

Origin and History.

The following account, taken from Hale's "Oregon Trade Language," is probably as good a history of the jargon as there is, to within a few years:

> The British and American trading ships first appeared on the north-west coast during the closing years of the last century. The great number of languages spoken by the native tribes proved to be a serious hindrance to their business. Had it chanced that any one of these languages was of easy acquisition and very generally diffused, like the Chippeway among the eastern tribes, the Malay in the Indian Archipelago, and the Italian in the Mediterranean, it would, no doubt, have been adopted as the medium of communication between the whites and the natives. Unfortunately, all these languages—the Nootka, Nisqually, Chinook, Chihailish, and others—were alike harsh in pronunciation, complex in structure, and each spoken over a very limited space. The foreigners, therefore, took

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no pains to become acquainted with any of them. But, as the harbour of Nootka was at that time the headquarters or chief emporium of the trade, it was necessarily the case that some words of the dialect there spoken became known to the traders, and that the Indians, on the other hand, were made familiar with a few English words. These, with the assistance of signs, were sufficient for the slight intercourse that was then maintained. Afterwards the traders began to frequent the Columbia River, and naturally attempted to communicate with the natives there by means of the words which they had found intelligible at Nootka. The Chinooks, who are quick in catching sounds, soon acquired these words, both Nootka and English, and we find that they were in use among them as early as the visit of Lewis and Clark, in 1804.

But when, at a later period, the white traders of Astor's expeditions, and from other quarters, made permanent establishments in Oregon, it was soon found that the scanty list of nouns, verbs, and adjectives then in use was not sufficient for the more constant and general intercourse which began to take place. A real language, complete in all its parts, however limited in extent, was required; and it was formed by drawing upon the Chinook for such words as were requisite, in order to add to the skeleton of which they already possessed the sinews and tendons, the connecting ligaments, as it were, of a speech. These consisted of the numerals (the ten digits and the word for hundred), twelve pronouns (*I, thou, he, we, ye, they, this, other, all, both, who, what*), and about twenty adverbs and prepositions (such as—*now, then, formerly, soon, across, ashore, off-shore, inland, above, below, to, with*, &c.). Having appropriated these and a few other words of the same tongue, the Trade Language—or, as it now began to be styled, "the jargon"—assumed a regular shape, and became of great service as a means of general intercourse.

But the new idiom received additions from other sources. The Canadian *voyageurs*, as they are called, who enlisted in the service of the American and British fur companies, were brought more closely in contact with the Indians than any others of the foreigners. They did not merely trade, they travelled, hunted, ate, and, in short, lived with them on terms of familiarity. The consequence was that several words of the French language were added to the slender stock of the jargon. These were only terms such as did not previously belong to it, including the names of various articles of food and clothing in use among the Canadians (bread, flour, overcoat, hat), some implements and articles of furniture (axe, pipe, mill, table, box), several of the parts of the body (head, mouth, tongue, teeth, neck, hand, foot), and, characteristically enough, the verbs to run, sing, and dance. A single conjunction or connective particle, *puis*, corrupted to *pe* and used with the various meanings of *then, besides, and, or*, and the like, was also derived from this source.

Eight or ten terms were made by what grammarians term onomatopœia,—that is, were formed by a rude attempt to imitate sound, and are therefore

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the sole and original property of the jargon. Considering its mode of formation, one is rather surprised that the number of these words is not greater. *Liplip* is intended to express the sound of boiling water, and means to boil. *Tingting*, or, more commonly, *tintin* (for the nasal sound is difficult to these Indians) is the ringing of a bell, and thence any instrument of music. *Po* or *poo* is the report of a gun; *tiktik* is for a watch; *tumtum* is the word for heart, and is intended to represent its beating. The word *tum*, pronounced with great force, dwelling on the concluding *m*, is the nearest approach which the natives can make to the noise of a cataract; but they usually join with it the English word *water*, making *tum-wata*, the name which they give to the falls of a river. *Mash* represents the sound of anything falling or thrown down (like the English *mash* and *smash*); *klak* is the sound of a rope suddenly loosed from its fastenings, or "let go."

All the words thus combined in this singularly constructed language, at that stage of its existence, were found to number, according to my computation, about two hundred and fifty. Of these, eighteen were of Nootka origin, forty-one were English, thirty-four French, one hundred and eleven Chinook, ten formed by onomatopœia, and some thirty-eight were of doubtful derivation, though probably for the most part either Chinook or Nootka. But, as might be expected, the language continued to develop. Its grammar, such as it was, remained the same, but its lexicon drew contributions from all the various sources which have been named, and from some others. In 1863, seventeen years after my list was published, the Smithsonian Institution put forth a "Dictionary of the Chinook Jargon," prepared by the late George Gibbs, a thoroughly competent investigator. His collection comprised nearly five hundred words. Those of Chinook origin had almost doubled, being computed at two hundred and twenty-one. The French had more than doubled, and comprised now ninety-four words. The English words were sixty-seven. The great Salish or "Flathead" stock, with whose tribes, next to the Chinook, the Oregon traders had the largest relations, furnished thirty nine words. The Nootka in its various dialects, now yielded twenty-four. The others, about forty, were due to the imitation of natural sounds, or were of casual or undetermined derivation.

Since the publication of the vocabulary of Gibbs, no material change seems to have been made in the language. Two later dictionaries of the jargon have come into my hands—small pamphlets, both printed in Victoria, British Columbia, the one in 1878 and the other as late as 1887. The former is announced as the "sixth edition," the latter is described as a "new edition"—facts which sufficiently prove the continued and extensive use of this international speech.

Mr. Hale says that since the publication of the dictionary of Gibbs no material change seems to have been made in the jar-

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gon because two late dictionaries which he has obtained show no great change. This is a mistake, but a very natural one for him to make, for I have examined seven dictionaries which have been published since that of Gibbs, and only one of them, that of J. B. Good, shows much change; and Mr. Hale while in Canada could not see the changes which are going on, but which are not shown in the dictionaries. The reason they do not show these changes, undoubtedly, is that the great change is in the adoption into the jargon of words from the English, and it is not necessary to put such words into a dictionary in order that English-speaking people may learn their meaning. Changes have been going on in the jargon just as steadily since the publication of Gibbs' dictionary as before that time. The great tendency has been to drop words of French and Indian origin and to introduce others from the English. This is easily accounted for from the fact that during the last thirty or forty years the French Canadians of the Hudson Bay Company have mainly been crowded out of the United States and a large part of British Columbia to the very frontiers, while English-speaking people have taken their places, mingling and working with Indians.

Usefulness and Future of the Jargon.

The usefulness of the jargon is proved by the fact that it has lived and worked its way from its birthplace, at the mouth of the Columbia river, south to California, east to the Rocky mountains, and north far into Alaska, and this has been done notwithstanding the paucity of its vocabulary, its lack of grammar, the fact that nice shades of meaning cannot be easily expressed in it, and that it has numerous Indian languages and the English with which to contend, which the people have used from infancy and which they prefer to use whenever they can. In the region bounded by the above limits are scores of Indian languages which would be very difficult for the whites to acquire. The Chinook jargon obviates the necessity of learning them, as a person who has acquired it can easily converse with Indians who speak different languages.

It was this which led me to acquire it. When I came to the Skokomish reservation, in 1874, three entirely different Indian

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languages besides the Chinook jargon were spoken here by Indians belonging to as many tribes. My intention was to learn the one native to the place, but I soon found that if I were to do so I would not be able to converse with the Indians belonging to the other two tribes; so I learned the Chinook jargon, and found it very useful.

Horatio Hale said in 1841 that the tide of white population which was setting in this direction would soon overwhelm it, "leaving no trace, but such as may exist on the written page." In 1890 he said that the prediction has been only partially fulfilled, adding, "the language, in fact, seems destined to a long life and wide usefulness, though in a region somewhat remote from its original seat. On the site of Fort Vancouver it is now only heard from stray Indians, who have wandered thither from their reservations. But on the reservations and in the interior it is still in frequent use. . . . In British Columbia and parts of Alaska it is the prevailing medium of intercourse between the whites and the natives. There, too, the Indian tribes are not likely to die out." He also adds that these natives are likely to keep up a friendly commerce with their civilized neighbors for centuries, and that this will be done by means of this jargon; so that there is reason to believe that it will have its office of an international speech to fulfill among the many-languaged tribes of northwestern America for hundreds and perhaps thousands of years to come. This spread, this life of the jargon, so contrary to his ideas fifty years ago, is due solely to its usefulness.

Its future will depend on this same usefulness. As the Indians die or learn to speak English, as they are now doing on Puget sound, it will soon be of no use. I have been surprised to see how little Chinook the school children know who are even sixteen years of age. Yet the reason is plain; it is for intercourse between whites and Indians. But they have learned the English from an early age, and so have had no use for the Chinook. As nearly all the Indian children on Puget sound of school age are now in school, there will be no use for it when their parents are dead.* But so long as there will be Indians from California to

*Oregon Trade Language, pp. 21, 22.

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Alaska who cannot easily speak English, so long will it be useful and live; Hale prophesies for hundreds or even thousands of years; I cannot prove the contrary.

Letters.

The following letters are those which properly belong to the jargon as it was spoken forty years ago, namely, *a*, *b*, *c*, *d*, *e*, *g*, *h*, *i*, *k*, *l*, *m*, *n*, *o*, *p*, *s*, *t*, *u*, *y*, *z*. Of late years, since so many English words have crept into use, the Indians have learned to use nearly all the other English sounds, as *f*, *j*, *v*, and even occasionally *r*, the most difficult of all for the Indian to use, while *q* is *kw* and *x* is *ks*. Père St. Onge says that *kl* is not proper, not being used by the Indians, but rather *tl*. I shall not dispute him in regard to its use where he has lived, but on Puget sound it is one of the very common sounds, not only in the Chinook jargon but in the native languages.

Number of Words.

The number of words I have recorded in the Chinook-English part is 1,402; in addition to these there are 1,552 phrases which answer to single English words. I have rejected none that I have found in any dictionary or in use among the Indians. Gibbs in his excellent dictionary did reject a number, because he did not believe they properly belonged to the jargon, but were introduced by some persons for the sake of local convenience. But I have not done so; for as I think I know better than people at a distance what words are used in this region here and now, so I believe that Rev. S. Parker knew better than myself what ones were used about Fort Vancouver in 1835; that Hon. J. G. Swan knew better than I do what were used about Shoalwater bay in 1853; that Rev. S. P. Good knew what were used on Thompson's river ten years ago; that Père St. Onge knew better what were used in middle Washington when he lived there, although many of these words may not be used here or may be entirely obsolete.

The increase in the number of words now used and those formerly recorded may be seen from the fact that Gibbs gives

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490 words; Hale, 473; Gill, 560; Durieu, 425 words and phrases; St. Onge, 787; and I have found 1,402, and 2,954 words and phrases. In the English-Chinook part, Hale gives 634; Gibbs, 792; Good, 825, and Gill, 1,378, while Durieu and St. Onge have no such part. I have found 4,001. St. Onge gives 67 phrases which begin with the word *mamook;* I have found 209.

Words—Changes.

Transition is and always has been a more marked feature of this jargon than of almost any language. Many words used years ago are not used now; others have taken their places, while many new ones have also been introduced. Of the 1,402 words I have found, only 740 are now used in this region, and of these I have recorded 374 which I have found in no other dictionary, nearly all of which are of English origin. In 1863 Gibbs gave more of French origin than of English—94 of the former and 67 of the latter. When, however, the Hudson Bay Company removed from this region, and with it the French Canadians, these words of French derivation began to be dropped. Thus out of 111 such words which began with the letter *l*, only 33 are now used in this region. Many words of Indian origin have likewise been dropped, English words having taken their places.

The words which are used here now are, however, not all used in other places, and undoubtedly there are many employed in other localities which are in none of the dictionaries and which are not used here. It has even sometimes been said that it is quite difficult for a person who can speak the jargon on Puget sound to understand it as spoken in Oregon or British Columbia, and while I have not found this to be exactly true, yet I have found considerable difference in its use. A year ago I asked Dr. W. C. McKay, of Pendleton, Oregon, to mark those words in Gill's dictionary which were in use in northeastern Oregon. He did so, and I found 131 words which had not been used on Puget sound.

On reservations where Catholic missionaries labor among the Indians many words are used which are different from those employed where Protestant missionaries work, although they may not be very far apart. Among the former not so many of

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the words of French derivation have been dropped as among the latter.

Obsolete Words.

It is very difficult to learn how many words have become completely obsolete, although many are undoubtedly so, because those which are obsolete in one region are not in another. As just mentioned, of the 1,402 words I have found, 662 are obsolete here, and of the 1,028 I have found in the various dictionaries, only 288 are used here.

A noted instance of how a word may become obsolete is found in the word *mamook*. On Puget sound it is probably the most common word in use. I have found 209 phrases which begin with it, which answer to a single English word, two and a half times as many as any other word begins. Dr. F. Boas says, however, that it "has acquired an obscene meaning, and is no longer in use on the Columbia river."*

New Words.

It is a singular fact that while new words are being constantly introduced into the jargon, that new dictionaries have been made and new editions of old ones published, yet very few of these words have been inserted. Good has done more of this than any other writer, probably because he was a missionary among the Indians, used these words in his intercourse with them, and so found that they had become a part of the language.

I have often noticed these new words as they were being introduced. Twenty years ago we used the word *Sunday* both for week and the Sabbath, but now *week* is used for week, and *Sunday* for the Sabbath.

It may be objected that these are English words and do not properly belong to the Chinook jargon, but they are used both by whites and Indians when they employ the jargon, and so have become a part of it, as it now is, as certainly as *house*, *stone*, or *shuga* were in 1863.

*Science, March 4, 1892, p. 129.

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Origin of Words.

The origin of a large number of words is given below as far as I have been able to learn them. The second column gives the origin of those found by Gibbs:

	Eells.	*Gibbs.*
English	570	67
Chinook	198	200
French	147	90
Chehalis	64	32
Nootka	23	24
Nisqually	13	7
Onoma	12	6
Clatsop	10	
Twana	6	
Canadian French	6	4
Wasco	5	4
Nittinat	5	
Clallam	4	
Yakima	4	1
Kalapuya	3	4
Nez Percé	2	
Klikitat	2	1
Clyoquot	2	
Snohomish	2	
Bellabella	1	
Makah	1	
Tillamook	1	
Chippeway	1	
	1,082	

This leaves the origin of 320 unaccounted for, or rather something over that number, as occasionally a single word in Chinook jargon is referred to two or more different languages for its origin.

Spelling.

The spelling of the words is a curiosity. The earliest writer who published a dictionary for popular use (Lionnet, in 1853), instead of following the phonetic method, the only one suitable for Indian languages, tried to follow the English method; in other words, no method at all. Gibbs, Gill, and Hibben have

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followed him. The latter two were almost the only dictionaries available to the public for many years in Oregon, Washington, and British Columbia, and now it seems to be almost as useless to attempt to reform the spelling, which is very miserable, as it is to reform the spelling of the English language.

While, as a general thing, Gibbs, Hibben, Hale, Tate, Gill, Lowman and Hanford, and Good spell the words nearly alike, yet they do not always do so, and the different ways in which some words are spelled by these and other writers is a curiosity. It shows what even educated men will do in this line when they have no standard authority. Very seldom is any word, even the simplest one, spelled in the same way by all the writers, and some of them are spelled in many different ways. For instance, the word *klonas* is spelled in eight different ways, *ahnkutlie* and *keekwulee* in nine, *klootchman* and *kliminawhit* each in ten, *kloshe* in eleven, *klatawa*, *seahost*, and *mimoluse* each in twelve, *tahtlum* in thirteen, *kalakala* and *kilapi* each in fourteen, and *kunjih* in sixteen ways. The following four examples are given: *Klootchman* (woman), spelled thus by Gibbs, Tate, and Hibben, is spelled *cloocheman* by Winthrop, *cloochemin* by Durieu, *clootchman* by Good, *cloachman* by Lee and Frost, *clotsheman* by Dunn, *kloochman* by Gill and Lowman and Hanford, *kleutchman* by Swan, *tlatcheman* by Ross, *tluchmen* by St. Onge. Powell would spell it *klutc-man*.

Words—Parts of Speech.

There are far more nouns in the jargon than there are words in all other parts of speech combined—958 out of 1,402, and 817 out of 1,552 phrases representing words. Verbs come next, 165 words and 519 phrases; next are the adjectives, 214 words and 300 phrases. Pronouns claim only ten words and seven phrases; adverbs, fifty words and fifty-six phrases; prepositions, nine words and three phrases; conjunctions, seven words and two phrases, and interjections, sixteen words and two phrases.

Expressive Words.

A few words are very expressive, meaning so much and expressing that meaning so much better than our English words

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do, that they have been adopted into the English in the region in which the Chinook jargon is used. Of these may be mentioned *cultus*, good for nothing, meaning also abject, barren, bad, common, careless, defective, dissolute, filthy, foul, futile, immaterial, impertinent, impolite, no matter, rude, shabby, slippery, unmeaning, untoward, useless, worthless, paltry, and worn out; *kloshe*, good, with forty-one other meanings; *kloshe nanitch*, take care, with seventeen other meanings; *tamahnous*, sorcery, a noun, adjective, and verb, and referring to anything supernatural between Satan on the one hand and God on the other; *tumtum*, mind, with fifteen other meanings, and *wawa*, with the following eighty-one meanings: as a verb, to ask, talk, converse, speak, call, tell, answer, inquire, declare, salute, announce, apply, articulate, allege, assert, blab, chatter, communicate, converse, argue, demand, discuss, express, exclaim, gab, gossip, harangue, hint, inquire, interrogate, jabber, lecture, mention, mutter, narrate, proclaim, profess, relate, request, remark, report, say, solicit, supplicate, bark (of dog), neigh, whinny (of horse), mew or purr (of cat), grunt (of hog), caw (of crow), warble (of bird), hoot (of owl), coo (of a dove), baa (of a sheep), cackle, cluck, crow (of chickens), quack (of duck), growl (of bear), squeak (of mouse), bleat (of a calf or sheep), yelp; as a noun, an anecdote, conversation, declamation, exclamation, oration, legend, mandate, narrative, message, precept, question, remark, report, sermon, talk, tale, speech, voice.

Phrases.

While some words are very expressive, on the other hand it often takes two or more Chinook jargon words to make one in English. As extreme instances, the word geography needs the following: *ikt*, book, *yaka mamook kumtuks nesika kopa illahee* (one book that teaches us about land); accident needs *nika tumtum yaka halo chako kahkwa* (I thought it not happen so); a butcher, *man yaka kumtuks mamook mimoluse moosmoos* (a man, he knows (how) to kill cattle); a jury, *tenas huju man kopa court klaska tikegh kumtuks kopa konoway mesachie, pe mamook kloshe kopa tillikums* (a few men at court who wish to know about all badness or crimes and straighten out the people).

While many of the Indian words are becoming obsolete, yet a few are so expressive and useful that they are used in many

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phrases which answer to a single English word. Thus *hiyu* (many) begins 30 such phrases and is found in 16 others, 46 in all; *wake* begins 53; *kahkwa* begins 54 and is in 14 others, 68 in all; *wawa* begins 31 and is in 46 others, 77 in all; *chako* begins 63 and is in 18 others, 81 in all; *halo* begins 85 and is in 9 others, 94 in all; *tenas* begins 82 and is in 29 others, 111 in all; and *mamook* begins 209 and is in 29 others, 238 in all; these form 209 of the 519 phrases which represent verbs.

Order of the Words.

There is no settled authority in regard to the order of the words. They are generally placed in much the same order as they are in the language which the speaker has been accustomed to use. An English-speaking person will place them in much the same order as in English, though there are a number of phrases of which this is not true; for instance, *halo nika kumtuks* (not I understand) is much more common than *nika halo kumtuks*. These phrases must be acquired by practice. An Indian who has learned somewhat the English order will arrange the words in much the same way; but if he is an old Indian, or one who knows but little about English, he will arrange them much as he is accustomed to in his native language, which is very different from the English. As the tendency, however, is not for the whites to learn the native languages, but for the Indians to learn English, so the tendency is toward the English order of the words.

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Union City, Washington.

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THE CORRELATION OF ANATOMICAL OR PHYSIOLOGICAL MEASUREMENTS.

BY FRANZ BOAS.

It is one of the objects of anthropometric investigations to establish types of certain varieties of man, the results of anthropometric statistics being a means of describing in exact terms a certain variety and its variability. This method of describing varieties has been applied so far in the case of man and of domesticated animals only. In most cases biologists have been satisfied with verbal descriptions of varieties and of variability and no attempts at an exact definition have been made. It is clear, however, that the method may be applied advantageously in all investigations of variation and a *biometric* method would undoubtedly open new ways of attacking the problems of variation and transformation.

The results of measurements of a certain variety present themselves in the following way: The measurement has a series of values which occur with different frequency. Generally the average of all its values is found most frequently and the other values are distributed around it according to the laws of chance. Then the description of the type is an enumeration of those distributions as studied in a series of measurements. The measurements may relate to anatomical features as well as to physiological functions or to relations between the two.

The problem of defining the type is, however, not finally solved by the enumeration. The measurements ought to be selected and treated in such a manner that those which are independent of each other may be recognized as such, and that typical correlations be brought out clearly.

It may be well to state this problem in a mathematical form which will bring out most clearly the points to be observed.

Any anatomical or physiological measurement of an organism may be considered a function of the general conditions of heredity and environment affecting the measured individual as a whole and in those parts which have been subjected to measure-

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ment. If two such measurements be called M and M_1, the conditions $a_1, a_2, a_3 \ldots a_n$; we have

$$M = f(a_1, a_2, a_3 \ldots a_q);$$
$$M_1 = f_1(a_1, a_2, a_3 \ldots a_q).$$

The variable conditions $a_1, a_2 \ldots a_q$ may be divided into three classes: those which influence M alone, which we will call x; those which influence M_1 alone, which we will call y; and those which influence both M and M_1, which we will call z.

$$(1) \quad M = f(x_1, x_2 \ldots x_m; z_1, z_2 \ldots z_p);$$
$$M_1 = f_1(y_1, y_2 \ldots y_n; z_1, z_2 \ldots z_p).$$

When the influence of z disappears in these functions M is independent of M_1, and both ought to be contained in the list of measurements, but their proportion would not indicate any biological law.

Biological considerations lead to the conclusion that in most cases the influence of z will be small as compared to that of x and y. When two measurements of distinct parts of the body are compared the complexes of cells which compose these parts have distinct life histories, and have, therefore, been subject to quite different influences. The same may be said of neighboring measurements taken in different directions—for instance, transversal and longitudinal measurements. Thus when breadth of head and stature are compared, we know that after the fifth year of life the rate of increase of the former is very slight, while stature continues to increase very rapidly during the whole period of growth. Circumstances which may exert an influence upon the latter will, therefore, remain almost without effect upon the former. While it is probable that there are always causes which affect only the one or the other measurement, their amount as compared to the causes affecting both simultaneously must be left to an investigation of the observed measurement.

This inquiry may be carried on in the following manner: Supposing that the influence of z disappears entirely, we have

$$M = f(x_1, x_2 \ldots x_m);$$
$$M_1 = f_1(y_1, y_2 \ldots y_n).$$

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If we select a group of individuals for which $M_1 = constans$, $x_1, x_2 \ldots x_m$ are not restricted in any way, and the distribution of M will, therefore, remain unaffected by the restriction in regard to M_1. In most cases the distribution of M will follow the laws of chance with greater or lesser approximation, and the values of M may be represented by their average. Then the average will remain constant whatever the value of M_1 may be. This consideration may be inverted and we may say that whatever the value of M, the correlated average of M_1 will remain the same.

When the influence of z is small as compared to those of x and y respectively, a different phenomenon will follow. The equation (1) may be transformed as follows:

$$(2)\quad M = F(x_1, x_2 \ldots x_m) + F_1(z_1, z_2 \ldots z_p) + F_2(x_1, x_2 \ldots x_m; z_1, z_2 \ldots z_p);$$

$$M_1 = \Phi(y_1, y_2 \ldots y_n) + \Phi_1(z_1, z_2 \ldots z_p) + \Phi_2(y_1, y_2 \ldots y_n; z_1, z_2 \ldots z_p).$$

According to our assumption, F_1, F_2, Φ_1, and Φ_2 are small as compared to F and Φ. That means that when we select a group of individuals for which $M_1 = constans$, we shall find that the corresponding value of M is slightly modified, and consequently the average value of all the M belonging to $M_1 = constans$ will also be slightly modified. The modification will be the greater the greater the influence of z. *Vice versa*, when M is selected as constant, M_1 will be modified only slightly.

When F, F_2, Φ, and Φ_2 are small as compared to F_1 and Φ, a similar result may be expected. The proof of this is not quite easy, but I will introduce a few considerations which will serve to illustrate the argument. Provided the functions Φ_1 and F_1 are entirely independent of each other. When M_1 differs considerably from the average, $z_1, z_2 \ldots z_p$ must fill certain conditions which will always give Φ_1 a large value. There are numerous combinations of $z_1, z_2 \ldots z_p$ possible which will fill these conditions. As there is no connection between F_1 and Φ_1, and as the values of both functions, which are near the general average, are more frequent than the higher or lower values, the majority of the values of F_1 must be near the average. The average of all the F_1 must, therefore, be near the general average.

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When, however, a certain series of causes control two measurements, it seems very probable that they act upon both in the same manner; that is to say, if the averages of F_1 and of Φ_1 be called μ' and μ_1' respectively,

$$F_1 : \Phi_1 = \mu' : \mu_1'.$$

When $M_1 = constans$, and the influence of y disappears, the deviation from the general average will be borne by z alone. When the influence of y increases, the deviation will be borne by both z and y, because the general deviation will result most frequently from smaller deviations caused by both variables. We will call the component parts of this deviation d and d', and the average of all the F, μ; that of all the Φ, μ_1.

$$M_1 = (\mu_1 + d) + (\mu_1' + d') = \mu_1 + \mu_1' + d + d'.$$

Then, on account of the relation of F_1 and Φ_1, we have

$$M = \mu + (\mu_1' + d')\frac{\mu'}{\mu_1'} = \mu + \mu' + d'\frac{\mu'}{\mu_1'}.$$

This equation proves that in this case also the increase of M is less proportionately than that of M_1.

I will give a few illustrations of this phenomenon.

A comparison of the correlation of length and breadth of head of 923 adult male Sioux, Crow, and western Ojibwa gives the following result:

Group	I.	II.	III.	IV.	V.	VI.
Length of head	180–181*	185–189	190–194	195–199	200–204	205–209*
Average length of head	182.2	187.1	192.0	196.7	201.3	205,9
Average breadth of head	153.8	153.8	154.8	156.2	157.8	159.4

When the same individuals are classed according to breadth of head, the following results are obtained:

Group	I.	II.	III.	IV.	V.
Breadth of head	145–149*	150–154	155–159	160–164	165–169*
Average breadth of head	147.2	152.2	156.8	161.3	166.2
Average length of head	190.9	193.5	195.5	196.4	199.1

*Millimeters.

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I have arranged these results graphically on Fig. 1, in which the scale of breadth of head is selected so that it is proportional to the proportion of the averages of length and breadth of head. This is done in order to make the curves strictly comparable.

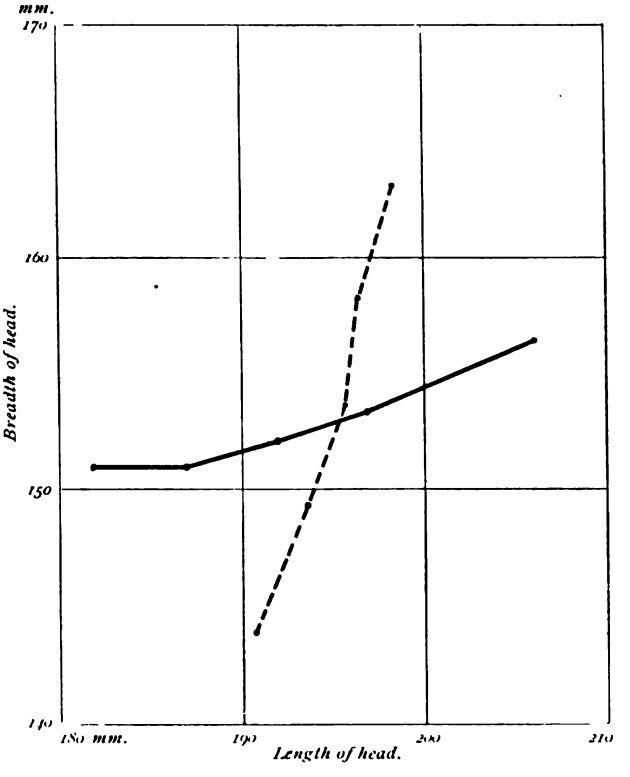


Fig. 1.—Correlation between length of head and breadth of head. 923 Indians. (——— Breadth determined by length; ------- Length determined by breadth.)

It is clear that if the breadth of head were a complete function of the length of head there could be only one curve expressing the interrelation between the two measurements. The fact that there are two curves shows clearly that the one measurement does not define completely the other, but that a number of factors influence each by itself.

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The following table gives a comparison between breadth of head and breadth of face among 782 adult male Sioux and Crow (Fig. 2):

Group	I.	II.	III.	IV.	V.	VI.	VII.
Breadth of head	144–148*	149–151	152–154	155–157	158–160	161–163	164–168*
Average breadth of head	146.8	150.3	153.0	156.0	159.0	161.9	165.5
Average breadth of face	144.5	146.0	148.4	150.6	152.4	153.5	156.1

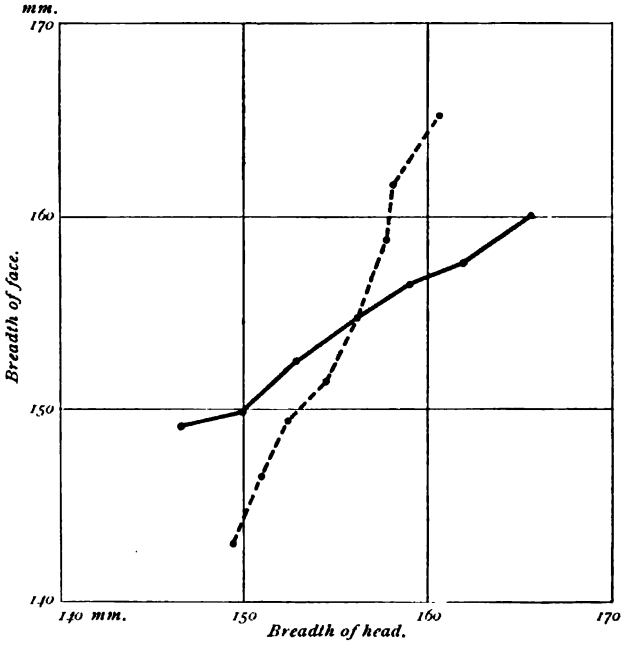


FIG. 2.—Correlation between breadth of head and breadth of face. 782 Indians. (——— Face determined by head; ------- Head determined by face.)

When the same individuals are classed according to breadth of face, we have:

Group	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Breadth of face	136–140*	141–143	144–146	147–149	150–152	153–155	156–158	159–164*
Average breadth of face	138.9	142.2	145.1	148.0	150.8	153.9	156.9	160.4
Average breadth of head	149.7	151.1	152.4	154.4	156.3	157.8	159.5	161.7

* Millimeters.

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Finally, I will compare stature and finger-reach of 801 adult male Sioux, Crow, and western Ojibwa between 20 and 60 years of age:

Group	I.	II.	III.	IV.	V.	VI.	VII.
Stature	161–164*	165–168	169–172	173–176	177–180	181–184	185–188*
Average stature	163.2	167.0	171.1	174.9	178.7	182.7	186.7
Average finger-reach	172.1	175 7	179.6	182.9	186.8	191.4	196.0

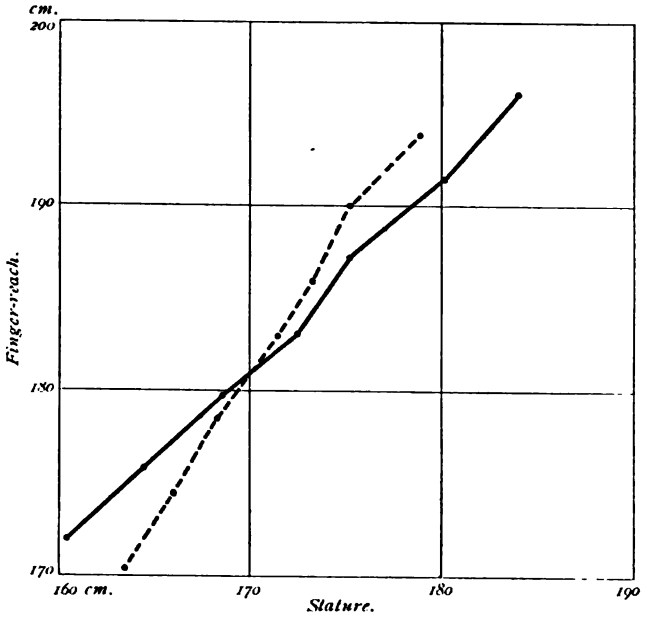


FIG. 3.—Correlation between stature and finger-reach. 801 Indians. (——— Finger-reach determined by stature; ------- Stature determined by finger-reach.)

Classed according to finger-reach:

Group	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Finger-reach	164–167†	168–171	172–175	176–179	180–183	184–187	188–191	192–195†
Average finger-reach	166.8	170.2	174.1	178 1	182.0	185.7	189.7	193.7
Average stature	162.3	165.5	168.2	170.6	173.3	175.5	177.6	181.3

* Millimeters. † Centimeters.

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I have selected these three pairs of measurements in order to illustrate the varying degrees of correlation. It is clear that the correlation of the first pair is very slight, while that of the last pair is very strong—that is to say, the influence of z is very slight in the first pair and very strong in the last pair. We find what was expected from a consideration of equation (2), that—

When any two biological measurements are considered as correlated and individuals showing a certain value of the first measurement are grouped together; then the average of the values of the second measurement for this group of individuals will also be changed, but to a lesser degree than the first.

This law will be found to hold good in all biological measurements. It has been pointed out as regards the correlation of brain weight and stature or weight of body, regarding the size of the foot and stature, and in several other cases. It also holds good in correlations of functions and anatomical features.

We may draw still another inference from a consideration of equation (1). As x, y, and z are fortuitous causes acting upon M and M_1, they will be distributed according to the laws of chance, and the frequency of great values will be much smaller than that of average values. When M_1 is constant, y and z must fill certain conditions and only a group of all the possible values of these two variables will be available; that is to say, when M_1 is constant, the variability of y and z must decrease. As z affects also the values of M, the decrease in variability will make itself felt in the distribution of that measurement. We conclude, therefore, that—

Whenever individuals showing a certain value of a measurement are grouped together, the variability of any second measurement of the group is smaller than the variability of the whole series.

The smaller the influence of z as compared to that of x, the less the variability will be affected, and we may consider the amount of the decrease in variability a supplementary measure of the proportion between the influences of x and z or a measure of the amount of correlation between the two measurements. To give an example: In the case of the correlation between length and breadth of head the decrease of variability is very slight. In the case of correlation between breadth of head and breadth of face we find a decrease of from about 5.5 mm. to 4.5 mm.; in that of correlation between stature, and finger-reach of from 6.3

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cm. to 3.7 cm. It will be seen that the nearer the two curves representing the correlated values, the greater the decrease in variability. The decrease is, however, always small.

It can be shown in what cases this is due to the fact that the two measurements are influenced by independent causes, x and y, and when it is due to restrictions in regard to the common causes, z. When M_1 differs much from the average, y and z must also differ much from the average, and certain grou ps of possible values of these variables do not bring about the desired effect. Therefore the greater M_1 the more restricted the values of z and y. Therefore the variability of M must decrease with increasing M_1 unless the unchanged variability of x obscures this influence. I have not been able so far to find any M the variability of which decreases with increasing M_1, so that I conclude that in most cases there must exist a great many causes which influence the two measurements independently of each other. This fact shows that it would prove futile to endeavor to discover the ultimate causes of correlations.

The restrictions of z which result from the selection of a constant value of M_1 will also affect the distribution of the values of F_1 and F_2 and consequently those of M. It is very probable that they will not be distributed according to the laws of chance. As no decrease in the variability of M with increasing M_1 has been observed yet, it is doubtful if this influence makes itself felt materially. This consideration has led me, however, to investigate the influences of distribution in groups to that of the total number of observations.

As the value of M increases with increasing M_1 the distribution of cases is such that with increasing M_1 the maximum of frequency of M moves to higher and higher values. The general distribution will be the resultant of the superposition of all these single distributions. It follows from this fact that there must be a tendency to produce probability curves in the grand total, even if the component distributions show considerable deviations from this law. Whenever, therefore, there is any suspicion of such a deviation it may be investigated profitably by grouping the observed individuals. I have carried out this attempt for the correlation breadth of face and breadth of head among male adult half-blood Indians and found the expected result. The breadth of face of half-bloods shows the phenomenon that there is a slight deviation from the probability curve,

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which seems to be sufficient, however, to lead to the conclusion that there is a cause for it. In the following table, which represents measurements of 377 adult males, it will be observed that the frequency of the measurement 144–145 mm. is not as frequent as the neighboring measurements. As the head measurements resulting from similar numbers of observations are arranged much more regularly, I expressed on a former occasion the conclusion that we find here the narrow faces of the white and the broad faces of the European preserved in the half-bloods; that there is no tendency to reproduce a middle form, but a tendency to preserve one of the parental forms. It appears that when the material is subdivided according to breadth of head the same phenomenon appears with much greater force in each of these groups, thus proving beyond a doubt that the former interpretation is correct. It might be said that the same result would appear as clearly when the proportion of breadth of face and breadth of head were tabulated. This is undoubtedly true, but proportions of this character also change their relations with increasing absolute values of the measurement, so that the subdivision will bring out the phenomenon more clearly than the index. Besides, its repeated occurrence in four distinct series is the strongest proof of its reality.

Breadth of Face of Half-blood Indians as Determined by Breadth of Head.

Group	I	II	III	IV	V
Breadth of head (mm.)	149–151	152–154	155–157	158–160	All individuals observed.
Breadth of face.	Frequency of occurrence (in %).				
130–131 mm.	0.5		0.4		0.4
132–133	2.7		1.5	1.2	1.2
134–135	5.0	2.0	1.5	0.6	2.3
136–137	7.8	4.6	2.3	1.2	5.0
138–139	20.6	9.8	3.1	4.0	9.9
140–141	22.3	16.9	5.7	5.7	12.1
142–143	8.9	16.9	18.8	13.8	14.1
144–145	13.4	12.6	17.3	13.8	12.3
146–147	10.6	17.3	21.5	10.9	13.3
148–149	3.3	11.0	12.3	17.8	10.3

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Breadth of Face of Half-blood Indians, etc.—Continued.

150–151	1.7	5.1	7.7	12.7	7.7
152–153	2.7	3.1	5.4	5.7	5.3
154–155	0.5	0.7	1.9	2.3	1.7
156–157			0.8	3.5	1.4
158–159				4.0	1.4
160–161				1.2	0.2
162–163					0.4
164–165				1.2	0.5
166–167				0.6	0.1
168–169					

It will be remarked that in the preceding table the first maximum is strongest for the lesser breadths of head, while the second maximum is stronger for the higher values of breadth of head.

I was much surprised at finding a similar phenomenon when tabulating the length of head of the Sioux, Crow, and western Ojibwa in relation to their statures. While the general distribution shows hardly any asymmetry, the distribution of length of head arranged according to stature shows decided asymmetries of such a character that I am assured that these tribes are mixed of two elements, one having an average length of head of 193 mm., the other of 197 mm. It will be seen that two of these columns have only one decided maximum. These columns are, however, so asymmetrical and the asymmetry fits in so well with the preceding maxima that we are justified in considering this fact a corroboration of the evidence of the preceding columns.

Length of Head of Sioux, Crow, and Western Ojibwa as Determined by Stature.

Group	I	II	III	IV	V	VI
Stature (cm.)	160–164	165–169	170–174	175–179	180–184	185–189
Length of head.	Frequency of occurrence (in %).					
170–171 mm.						
172–173	1.2					
174–175	1.7					
176–177	0.6		0.2			
178–179	1.7	0.5	0.4	0.7		

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Length of Head of Sioux, Crow, and Western Ojibwa—Continued.

180–181.....	4.6	1.8	0.9	1.1	0.5	
182–183.....	5.2	2.1	1.6	1.1	0.5	
184–185.....	8.6	4.6	2.6	4.0	1.8	0.9
186–187.....	11.5	5.7	4.8	3.4	3.1	1.8
188–189.....	4.0	9.3	7.6	6.9	1.8	7.2
190–191.....	8.1	14.2	11.7	9.5	6.2	13.5
192–193.....	12.7	9.8	12.5	9.5	12.9	12.7
194–195.....	17.2	11.6	12.3	13.2	15.3	14.4
196–197.....	7.5	14.5	13.5	16.6	14.5	10.0
198–199.....	2.3	8.8	11.4	13.4	12.9	14.4
200–201.....	4.0	8.0	7.2	6.9	12.7	11.8
202–203.....	3.5	3.1	5.0	4.6	7.8	2.7
204–205.....	2.3	3.1	3.2	4.2	5.9	3.6
206–207.....	2.9	1.8	2.2	2.8	3.4	4.5
208–209.....	0.6	0.8	1.5	0.9	0.3	2.7
210–211.....		0.3	1.3	1.1	0.5	
212–213.....				0.2		

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BOOK NOTICES.

The Pawnee Language. By John B. Dunbar. [*An Appendix to Pawnee Hero Stories and Folk-Tales, by George Bird Grinnell, pp. 409–437, 1893.*]

This essay demands special attention from linguists, as it gives a better insight into the peculiarities of the Pawnee language than has hitherto been afforded. As stated by Mr. Grinnell and the writer of the essay, the Pawnee is one of a group of seven cognate dialects: Pawnee, Arikara, Wichita, Waco, Caddo. Kic'i (= Keechie or Kichai) and Tawakoni (= Tówakárehu). According to Mooney, there are several other dialects or languages spoken by tribes of this linguistic stock.

The Pawnee differs from most of the Siouan languages in the use of *r*, *s*, *t*, *ks*, *st*, *sk*, and *ts* as final consonants; whereas in Dakota and the languages of the Dhegiha and Tciwere groups every syllable ends in a vowel pure or nasalized. Certain letters in ordinary Pawnee discourse are interchangeable, as *păt'-kĭ*, *păt'-kĭ*, an acorn (in Biloxi, a Siouan language, there is a similar permutation of *a* and *u*); *kĭt-u-ha'-hĭ*, *kĭt-u-ha'-ri*, upland, etc.

A trait of Pawnee is the use of evanescent or euphonic terminal syllables: as, *a'-rus*, *a'-rus-ă*, a horse; *tăk'-er*, *tăk'-er-o*, who? Another use is the frequent omission of initial or final consonants in discourse: as, *ti-he'-ră pa'-u*, for *ti-he'-răs-ă pa'-u*, yonder hill; *pa'-pĭc'-ĭs i-kăr'-ĭ-kăt* for *pa'-pĭc'-ĭs ni-kăr'-ĭ-kăt*, half a dollar.

In the pronoun appear three genders, the standing, the sitting, and the reclining, answering to the three primary genders of the Siouan languages. Sex in nouns is shown thus: the feminine is frequently marked by prefixing *s* to an initial consonant: as, *ku'-ra-u*, a doctor; *sku'-ra-u*, a woman doctor; *ku'-ruks*, a bear; *sku-ruks*, a female bear. In other cases, *pit'-a*, man or male, or *c'ăp'-at*, woman or female, follows the noun or is suffixed to it: as, *a'-rus-ă*, horse; *ăs'-a-wit-ă*, stallion; *nĭk'-uts-kĭ*, bird; *nĭk'-uts-kĭ căp'-at*, a hen; etc. The dual occurs in all three persons of the pronoun and verb. Classifiers, which are used so extensively in the Siouan languages, appear to be wanting in the

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Pawnee, which has instead the article *la* or *lau*, that is always prefixed or else suffixed. A verbal root with the prefix becomes the equivalent of our agent or doer: as, *la-wăr'-ĭ*, the traveler; *a-wak'-a-hu*, the speaker. The Pawnee system of numeration, according to Mr. Dunbar, is by twenties. "Six" is compounded of "one" and *ksapĭts* or *sapĭts*, a word unknown to the reviewer. In like manner, "seven" is compounded of "two" and *ksapĭts* (or *sapĭts?*), etc. Judging by the analogy of other languages, the final syllable of nine (*-war*) points to that numeral as meaning "almost ten," or "one wanting to make up ten." Eleven should be compared with one (*ŭsk'-o:ŭsk-u-hu'-kĭt*) and with fourteen (*la-ku'-kĭt*) and fifteen (*si-huks-ta'-ru-kĭt*). Compare twelve (*pĭt-ku-su'-sĭ-di*) with two (*pĭt'-ko*), thirteen (*tau-ĭ-ruks'-ĭd-ĭ*) with three (*tau'-it*). Seventeen is "less three;" eighteen, "less two," and nineteen, "less one." Twenty should be compared with two as well as with *pit'-a*, man (*i. e.*, his fingers and toes). Thirty is evidently 10 + 20 (*luks'-ĭd-i* = *li-uks'-ĭd-ĭ*, and *pit'-au* = *wit'-au*). 40 = 2 × 20; 50 = 40 + 10; 60 = 3 × 20, etc. 1000 = "a box," as in Ponka, because when the Indians were paid their annuities in specie one thousand dollars filled a box. "The distinction of verbs as such from other parts of speech is not definitely marked in Pawnee. Besides verbs proper, other words, such as nouns, adjectives and adverbs, may admit partial or complete inflection as verbs." (This agrees with what we find in the Siouan languages.) To the verb belong mode, tense, number and person. "There seems to be no distinctive passive, though some apparently passive forms are found."

Transitions abound in the Pawnee. Similarly nouns may be incorporated (a process unknown in the Siouan tongues), as *ti-pŭks'-o-kŭt*, he cuts his head, from *ti'-kŭt*, he cuts, and *pŭks'-u*, head; *tu-riks'-ta-re-kar-uk'-u*, he washes his hands, from *tu''-ra-he*, it is good; *iks'-u*, the hand; *ta*, sign of plural; *kĭr-ar'-u*, water and *ti-rok'-o*, he makes. *Kuk'-ŭs*, hog, should be compared with the Dakota equivalent, *kukúshe;* Dhegiha, *kúkusi;* Tciwere, *kokótha;* Winnebago, *khkukhkúshera*, and the French *cochon*. *Nĭk'-uts-kĭ*, bird, reminds the reviewer of the Biloxi, *kûdĕska'*, *kúdĕski'*, which has the same meaning. The Pawnee possessive pronouns, *kúta*, his; *ku'-tas-i*, thy, and *ku'-tat-i*, my, can be compared with the Dakota, *tawa*, *nitawa*, *mitawa*; the Dhegiha, *eta*, *dhiṇa*, *wiṇa*, and the Biloxi, *kta*, *ita*, *inkta*, *ta* being common

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to all. In *lŭk'-u-taka*, to be white, the root *taka* may be compared with the Hidatsa *at^{h} â-ki*, white. (Could the Hidatsa have borrowed this from the Arikara?) Head in Pawnee is *pŭks'-u*, in Dhegiha, *pa;* foot in Pawnee is *ŭs'-u*, in the Siouan languages, *si*, *isi*, etc. A careful comparison of the Pawnee with the Biloxi, Hidatsa, and other archaic languages of the Siouan group will be apt to repay the student.

J. Owen Dorsey.

Man and Woman: A Study of Secondary Sexual Characters. By Havelock Ellis. London, 1894. Walter Scott. Imported by Chas. Scribner's Sons, New York. 408 pp., ill., 12mo. $1.25.

The woman question, after being discussed from many points of view, arrives at last at the doors of anthropology. Lombroso, Ferrari, Mason, Ward, and now Havelock Ellis take it up as a study in natural history. In the volume here considered the author devotes a chapter to the industrial side of primitive woman's life. The rest of the volume is taken up with the discussion of sexual characters, the growth and proportions of the body, the senses and sensibilities, physical vigor, intellect, metabolism, hypnotic phenomena, emotionalism, morbid psychic phenomena. Eliminating hasty generalizations not sufficiently demonstrated, the author concludes that there is greater variability in men than in women. With this we agree. Another conclusion is the greater precocity of women, giving them the characters of short men or of children. Furthermore the author does not agree that woman is undeveloped man, nor that the child life is less perfect than the adult life. On the whole, Mr. Ellis sees his problem in front of him and decides that many questions supposed to have been settled about the sexes will have to be reviewed.

O. T. Mason.

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NOTES AND NEWS.

REMARKS UPON THE CULTS AND CEREMONIES OF WESTERN AFRICA.—When in the few pages devoted to the Dahomeans I described the ceremonies of the priapic cult, which we attended, I limited myself, in passing, to pointing out the direction in which it would be necessary to look for its origin.

This cult, at the foundation of all the public fêtes in ancient Egypt, has survived until the present time in the Canaries. The he-goat played upon the altars the principal rôle, and in ancient Egypt he was associated with the sun. At Mendes he was "the soul of Osiris." Elsewhere, under the name of Mandou-Ra, he was enthroned as the god of war and of voluptuousness. He was also consecrated to the phallic deity Kem.

The alligator and the crocodile, which have the first rank in the religious ceremonies of Dahomey and whose position in the cult is not explained by considerations of terror or of utility, as is that of the serpent of Wydah, also inevitably bring to our minds the religion of ancient Egypt.

Sacred fowls have played a great rôle in all antiquity. To-day, in Alger, they are the only expiatory victims daily sacrificed in a mysterious cult which is practiced in the full light of day. Outside of the town to the west, down the route which leads along the coast, upon a little rocky point, two black sacrificers place themselves, toward nine o'clock in the morning, once or twice a week. The Kabyle women who have sick children present themselves to the sacrificers, each with a pair of fowls, to learn the issue of the malady. The sacrificers take the animals, make a small incision in the throat, and throw them upon the seashore, where they are wet by the waves. At the contact of the water with the wounds the animals beat their wings and convulsively distort themselves before death takes place. The women, squatting upon the shore, attentively watch this short ceremony. As to the sacrificer, he finishes his task without a word and restrains himself to maintain his gravity. Does he fear ridicule? It is probable. His firm, defiant manner discourages the questioner, and I do not interrogate him upon the answers he would draw from the examination of the dead fowls.

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He is the all-unconscious priest of a forgotten ancient cult, of which nothing but this vestige remains. I repeat that he is a Negro. It is, then, in the homes of the Negroes and by them that this ancient practice is preserved, this sacrifice upon the borders of the sea, the cult which, diffused by the Phœnicians, was without doubt in Africa of Punic origin. Time has passed without bringing any great change in their mentality. What they have formed the habit of doing once they continue to do, so to say, for all time, and when they have said of one of their practices "it is the custom" they have given a reason for its perpetuity which in their eyes is not only sufficient, but peremptory. They do not try to analyze it, still less to explain or criticise it. In the same way, when they have said of the new and extraordinary phenomena which the Europeans often cause them to witness, "it is the manner of the white man," their astonishment is immediately suppressed and their curiosity extinguished.

The essential practices of the Dahomean cult that I have described are identical with those found much nearer the heart of Africa; and it is not the Dahomeans, a band of warriors to whom the sanguinary despotism of a chief has accidentally given a kingdom, who are their propagators or inventors. When Dybowski penetrated the territory of the Ouaddas, upon the Oubangui, at the confluence of the Ombella, their chief, M' Paka, gave him two goats and two fowls, and plucking from the latter a handful of feathers, he said to him, "Throw these upon the head; it is a sign of peace and friendship." Farther on, in the country of the Banzivis, as soon as he arrived the chief, Bembe, brought to him two handsome black goats, and before he could determine what he intended to do with them he had cut both their throats and let the blood run at his feet. The chief then departed to make it plain that he did not wait for a gift in return.

A similar ceremony is held among the Langouassis, upon the Kemo. "The chief," Dybowski relates, "advanced toward me, holding in his hand a white fowl, from which he pulled the feathers, regardless of its cries, for me to stick in my hair and beard, and at the same time threw a handful at my feet. Then, after giving me the poor fowl and two he-goats, he and all his suite seated themselves before me. The peace is made."

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Much higher up on the Kemo, Dybowski came in contact—a rather menacing contact—with the Tokbos, who are allied with a tribe still more central, called the N'gapous. At first a man came to him, representing the chief. He pulled a handful of feathers from the white fowl which he brought as a gift and put them on his head, then gave him bread, millet, eggs, and tobacco. Soon after the chief, Krouma, presented himself, followed by a crowd of threatening warriors. Krouma evidently had decided not to make friends without a personal examination of the explorer. Seating himself before him, he closely watched all his movements. Having satisfied himself, he then got up to go away, and, taking a white fowl that one of the men carried, he went to the tent of Dybowski and threw a handful of feathers upon his head and feet. This is exactly the same ceremony, is it not, that the Dahomeans practiced before their deity?

Among the Bambaras, a mongrel tribe originally from central Africa, but now established upon the Niger, in about 8° to 10° west longitude, between the Moorish tribes on the north, the Peuls at the southwest and the east, and the Mandegnas on the south, the fowl and the goat play an equivalent and equally important rôle. Although a good number among them are Mussulmans, the fetich practices are maintained in the scattered villages. A pottery vase is their principal deity. They put on this a little human figure and a plate of iron surrounded with vulture feathers, after having spilled the blood of a fowl and goat. The ceremony is performed with an accompaniment of singing and the tom-tom. At other times the god is represented by a simple morsel of a tree root in a calabash. They often offer to him the fowls, which they sacrifice to the sound of an iron trumpet, together with millet and sorghum. By means of the fowls they also obtain a negative or affirmative answer to their inquiries. They cut the throats of the fowls partly through, as is done at Alger, and the response of the deity is yes or no if in dying they throw the heads backward or forward.*

In the region of the Upper Nile, among the Niams-Niams, the Bongos, and in the Ounyoro, analogous ceremonies are found. Islamism, however, has generally caused them to disappear in eastern Africa.—*M. Zabarowski, before the Anthropological Society of Paris.*

* Raffenel-Letourneau Sociologie, p. 283.

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AUGUSTUS SCHULTZE, D. D., President of the Moravian College at Bethlehem, Pa., in 1889 made a first attempt toward compiling a brief grammar and vocabulary of the Eskimo dialect spoken on the Kuskokwin river, Alaska. This has now been augmented with new facts due to the missionary, Rev. John Kilbuck, and others working in that field and republished as a "Grammar and Vocabulary," at Bethlehem, Pa., 1894, of seventy pages. The vocabulary is Eskimo-English and English-Eskimo. Some hymns and colloquial phrases are added to the volume. The words of the vocabulary are partly syllabicated, and the alphabet used is a scientific one. A dual exists in the noun, as well as in the adjective, pronoun, and verb. The numeral system is quinary-vigesimal. There are two conjugations of the verb, the one with suffixes and the other without suffixes. They correspond in a general sense to our transitive and intransitive verb. Schultze's terminology of the verbal forms should be more precise, and instead of prepositions he should call the particles in question "postpositions." The work is so short that it can hardly be called anything else but a compendium, but the linguistic data are substantially correct.

A. S. GATSCHET.

IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.—The report for 1892 of the Eastern Siberian branch of this Society has recently been published. In addition to a review of the numerous expeditions and explorations made and the publications on the subject, it contains an account of the various museums in eastern Siberia, including those at Tabolsk, Eniseisk, Minousinsk, Nerchinsk, Zakoutsk, and elsewhere. At these museums they have instructors who at certain hours of the day explain the collections to visitors.

JULIE MINDELEFF.

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THE

AMERICAN ANTHROPOLOGIST

VOL. VII. WASHINGTON, D. C., OCTOBER, 1894. No. 4.

CITIZENSHIP PRIZE ESSAYS.

On March 30, 1893, the ANTHROPOLOGICAL SOCIETY OF WASHINGTON announced by special circular and in the *American Anthropologist* (volume vi, 1893, pages 223–224) a proposed award of prizes for essays on "The elements that go to make up the most useful citizen of the United States, regardless of occupation." Two prizes were offered: "A first prize of $150 for the best essay and a second prize of $75 for the second best essay among those found worthy by the Commissioners of Award." The prizes were declared open to competitors in all countries. November 1, 1893, was the date fixed for the closing of the competition. It was provided that the essays should be examined and adjudged by five Commissioners of Award, including one anthropologist, one educator, one jurist, one statesman, and one other not specified, of whom at least one and not more than two should be members of the Society.

On October 25 the Commissioners of Award were announced (by circular and in the *American Anthropologist*, volume vi, page 330) as follows: Anthropologist, Dr. DANIEL G. BRINTON, of the University of Pennsylvania; educator, Dr. DANIEL C. GILMAN, President of Johns Hopkins University; jurist, MELVILLE W. FULLER, Chief Justice of the United States; statesman, ADLAI E. STEVENSON, Vice-President of the United States; not specified, Dr. ROBERT H. LAMBORN, of New York. At the same time the date for the closing of the competition was postponed to March 1, 1894.

On March 2, 1894, the Secretary of the Society, Mr. Weston Flint, tabulated by their pseudonyms the 42 essays received. Under

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instructions from the Commissioners of Award the Secretary, aided by two members of the committee originally appointed to arrange the details of the competition, made a preliminary examination of the papers and arranged them according to apparent merit in three groups. The 42 essays were then placed in the hands of the Commissioners, who examined the entire number carefully, and in most cases repeatedly, until on May 29 a verdict was reached. On the evening of that day a special meeting of the Society was held, at which the seals of the envelopes containing the pseudonyms of the successful competitors were broken, and their names were announced and the essays were read before the Society.

Of the 42 essays received under the terms of the competition, 32 came from the United States and nine from foreign countries, besides one not specified. Seventeen states and five foreign countries were represented. Five essays came from the District of Columbia and an equal number from Spain; four came from Ohio and three from New York; two each came from California, Georgia, Illinois, Minnesota, Pennsylvania, and the state of Washington; one each came from Connecticut, Denmark, England, Indiana, Iowa, Java, Kentucky, Mississippi, Missouri, Syria, Tennessee, and West Virginia; and one is of unknown source.

It is worthy of remark that about three-quarters of the essays were thought meritorious by the Commissioners of Award, and that about one-third of all were deemed especially good. Both the extent of the competition and the excellence of the essays attest the widespread and intelligent interest felt in the important subject of American citizenship.

The Society is under obligations, which it is a pleasure here to express, to the eminent gentlemen who kindly assumed the difficult and delicate task of examining and passing upon the essays offered in competition for the citizenship prizes.

The two prize essays, with the pseudonyms and names of the authors, are appended.

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FIRST PRIZE ESSAY.

The Elements which Make up the Most Useful Citizen of the United States.

BY ARISTIDES (PROF. SIMON NEWCOMB, U. S. N.)

Should we interpret our theme in its broadest sense our conclusions might be reached with great ease. A study of the conditions of human progress would lead us to the conclusion that during the last hundred years the most useful men have been those who have done most to mould the life, thought, and activities of the nineteenth century. In their ranks we find scientific investigators who have made discoveries in the laws of steam and electricity; inventors who have embodied these laws in useful forms, and so applied them as to promote the welfare of mankind; captains of industry who have built and managed steamships and railways, and opened new avenues to Nature's stores of wealth; philosophers who have voiced the aspirations of the people for liberty; jurists and teachers who have shown how that liberty could be so exercised and limited that every man should be a help to his fellow-men. Judging the future by the past, we shall be led to the conclusion that the elements of greatest usefulness in the citizen of the future are those calculated to make him the most successful discoverer, inventor, manager, administrator, legislator, jurist, or teacher.

But a closer examination of the words of our theme shows its intended field to be narrower and more suggestive. In defining the most useful citizen we should consider him simply as a citizen. For us he is not a specialist in any field of activity, however useful, but a man among men, influencing his fellow-men by showing them the good they all might do.

The elements which we are to consider will be yet further limited and suggested by adopting the economic idea of value, according to which usefulness depends not only on utility but on scarcity and difficulty of acquisition. From this point of view our most useful citizen will be one who possesses in the highest degree those qualities which are not only useful in themselves, but so far from universal that the good of the community

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requires their wider diffusion. As citizens we are all engaged, consciously or unconsciously, in making history. More than ever before does the prosperity both of ourselves and of our children depend on our social, industrial, and political conduct. Never before were correct public judgments of such conduct so necessary to the general welfare. The most useful citizen is he who can infuse the most practical wisdom into this conduct, and promote among his fellow-men the deepest insight into its consequences. To do this successfully he must not only be a wise man himself, but possessed of those personal qualities necessary to make others accept the results of his wisdom.

Guided by these preliminary considerations, we must place sane, disinterested, and frankly spoken views of public questions high in our list. To the formation and expression of such views, wide intelligence and sound practical judgment are necessary. He who is to influence his fellow-citizens for their own good must be so familiar with the political and financial history of his country as to know how the problems which confront us have been treated by our fathers, what have been the consequences of that treatment, and in what way we may improve upon it. He must also possess that sagacity in foreseeing the effect of public measures which long experience will aid, but which no education can provide.

With these qualities must be combined a standard of political morality in advance of public opinion, yet not so far in advance as to alienate public sympathy or make the acceptance of his views impossible. Always remembering the maxim "Magna Dii curant, minima negligunt," he will be careful not to consider as small things any political customs which tend to demoralize the public conscience. He will be in advance of public opinion, but not out of sight of it.

The most useful work in which the citizen thus equipped can engage will be the purification of our politics. We must leave it an open question whether this work can best be done through an active leadership in one of the great political parties or by remaining outside of them and acting as an independent. As parties are now organized, it is not certain that our citizen could successfully take a high place in the councils of either. Granting that he could, which every optimist must hope to be the case, his efforts and utterances will not be of the kind with

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which the public is most familiar. He will be careful to exact from his own party a standard of political morality fully as high, perhaps a little higher, than that which he holds up to the opposite party. He will not be found taunting the opposite party with its evil deeds this year and next year sustaining his own party in doing these very same deeds.

Of especial interest will be the ground which he takes in a nominating convention. He will not be a member of any faction claiming recognition of its supporters. He will feel that in selecting a candidate to be submitted to the voters of his State or district he is executing a public trust for the benefit of his party and of his country. He will be above making devotion to his personal fortunes a condition of support. The result will be that no dicker by which he shall agree to support the nominee of another faction in consideration of the nomination of one of his own faction will ever be made with him. If asked to support a bad man on condition of having the name of one in whom he believes placed on the ticket, he will reply that he demands nothing but the nomination of men whose character and standing will commend them to public support; that he considers all such men as belonging to his faction, and believing that only such ought to be nominated, he will not support any others.

His voice will be loudly heard in all matters that pertain to the ascertainment of the public will through the legal forms of elections. He will never cease to point out to his fellow-partisans as well as his fellow-citizens that the will of the people is the law of the land; that all the legal machinery of elections is devised to ascertain that will, and that the man or party who tries to make it work in such a way as to express something known to be different, is trying to make the machine do something which it never ought to do, and should be as severely condemned by his own party as by the other. In such a matter as the districting of a state he will denounce a gerrymander as unsparingly if proposed by his own party as when it is proposed by the other.

High though his standard may be, he will not be a chronic bolter. The very fact that his opposition to an unworthy candidate will be impersonal will secure his support for any worthy candidate who receives the party nomination. If told that he is bound in honor to support the nominee of the party, irrespective of merit, he will reply that there is only one obligation

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higher than this, the obligation of the citizen to protect the state against corruption. If a candidate is proposed whose nomination he thinks should meet with public condemnation, he will oppose it in convention for that reason and for no other, and will not turn back on his word so far as to assure the public that it is a good nomination after it is made.

If we accept the view that our citizen can be more useful as an independent than as a partisan leader, the character of his activity will be very obvious. He will take an active interest in public affairs and a judicial view of the policy and nominations of both parties, always voting for the candidates which seem to him the best, and urging others to do the same. Under no circumstances will he appear before Congress to promote measures in which he has a personal or pecuniary interest.

Intelligent and patriotic citizens who take the views of public affairs which we have just described are by no means rare; but their usefulness is greatly diminished by their failure to make their imprint on the minds of their fellow-men. We must, therefore, add to the qualities we have described those elements which will make our citizen a power for good. It would seem to follow that our most useful citizen must be, in his chosen profession or field of activity, a successful man. It is an unfortunate fact that one whose life has been a failure, no matter how meritorious may have been his motives, does not command the highest respect of the world. But in laying down this principle we must not consider success in too narrow a sense. Gained by unworthy means, it would afford the worst possible example for the young. On the other hand, if worthy means have been adopted, apparent failure may have been substantial success. One may seem to fail in the great majority of his attempts and yet make such an impression on his fellow-men by his conduct and writing as shall be a power after he has passed away. Measured by one standard, the public life of George William Curtis might be called a failure; yet the growing strength of his ideas of civil-service reform make it one of the finest examples of success that our generation can hold up to the rising one. The position of the martyrs, whose blood was the seed of the church, is among the grandest in history. Yet we may draw a broad line between a successful martyr and an unsuccessful one; between one whose life and works are calculated to excite the admiration of his fellow-men, and

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one who is doomed to oblivion when once lost sight of. It is also not necessary that the success of our citizen should be marked by what the world calls brilliancy, for this is not a quality which the young should be encouraged to aim at.

Yet another essential element is a readiness to take an active part in public affairs. The combination of this quality with the high standard of political morality which we have already described is not so common as it should be. The unfortunate fact appears to be that devotion to party, or to party leaders, acts as a more powerful incentive to public activity than devotion to the moral elevation of the community. Our men of intellect either find attrition with those who control politics to be distasteful, or they occupy positions in which they do not feel at liberty to speak their minds with the frankness which should characterize the most useful citizen. What we want is an invasion of our political domain by men animated by the motives we have described, and willing to make the same exertions to carry their point that the active politician constantly puts forth. If the qualities necessary in the invaders are both rare and needful, they must stand high among those of the most useful citizen.

It being conceded that our citizen should be able to influence his fellow-men for their own good, it follows that he should not be wholly wanting in those qualities which make the successful diplomatist and politician. It is true that we should be cautious in giving a very high place to these qualities. The divergence between the temper of the scientist and that of the diplomatist or politician turns on the point that the work of the one ends where that of the other begins. The scientist considers only what is true in fact and what is best in results; but when the diplomatist and politician have discovered what is true and what is good, they are only at the beginning of their task. They must consider whether their fellow-men are prepared to accept and act upon the truth and, if they are not, how the truth must be modified and made palatable. Immediate results must depend upon success in dealing with this very delicate problem of accommodating the true and the good to the tastes of a possibly unappreciative public; and, were no results but immediate ones to be considered, we should have to place the qualities in question very high in our list. But we must also remember that the

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earnest and repeated proclamation of a truth which cannot be disputed is sure to make itself felt in the long run, and therefore persistence in proclaiming it may compensate for want of tact in its adaptation.

Of equal importance with the qualities which we have described is that of correctness of view. If our citizen maintains fallacious economic or political theories, all the good qualities which he possesses may be sources of evil rather than of benefit to the community. He must therefore have a correct appreciation of the way in which economic causes act in promoting or retarding the general welfare. He must see farther into the action of such causes than do men in general. He must therefore have had a better education in economic principles than that afforded by the daily press, which enforces only the average views of the average man, and rarely avails itself of profounder investigation or more careful study than that to which the average man is himself prone.

One field in which this greater breadth of view should be especially conspicuous is that of the ethics of charity. It being conceded that the highest aim of the best man is the greatest good of the greatest number, we must remember that individual men are constantly passing away, as the waters of a river flow by us, but that the human race as a whole, like the river itself, is to endure through the ages. Our citizen will therefore clearly perceive that the good or evil fortune of the individual is not alone to be considered, and that the effect of any proposed policy upon the race must always be carefully investigated. Hence as a promoter of charitable works he will hold that the effect of charity on the race is more important than its benefit to the individual relieved. In the presence of distress his question will not be, Can I relieve this fellow-being? but, Can I promote in him those qualities of sturdy manhood, independence, and industry which, once implanted in him, will be inherited by his posterity? If he finds that the only effect of charity would be to promote abjectness, demoralization, and dependence, he will resolutely refuse it because of the conviction that it is better the man should die as he is than that he should live to breed an abject, demoralized, and dependent posterity.

Our most useful citizen cannot be a selfish man, and *esprit de corps* is so nearly the opposite of personal selfishness as always

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to command respect; but it is liable to degenerate into a form of class selfishness, all the more dangerous because of the very respect which it commands. So far as it consists in devotion to such common interests of a class as do not conflict with those of the public, it is to be commended; but the most unselfish devotion to the interests of the corps may result only in endeavors to promote its interests at the expense of those of the public. The latter frequently fails to see the great difference in the two cases, and it is therefore essential that our citizen should see it and govern himself accordingly.

Physical qualities are not to be left wholly out of consideration. We recognize more clearly than did our ancestors that mental qualities are closely associated with them, and that a man cannot attain to his fullest development without a basis of physical health. We must therefore assign to the latter a high place among the elements of usefulness. At the same time we should include under this term something more than a successful performance of the animal functions. To be really useful, physical health should be associated with that tireless energy to which it is so conducive. Who is languid in body is languid in mind, and he who loves ocean and mountain for their own sake will probably have the mental energy necessary to make an impression on the world.

Finally, good stature, breadth of person, and commanding presence may be included in our list as elements which, though adventitious, are yet not without importance. While the small man may in the long run exercise as much influence as the large one, it will take him longer to make that influence felt. He needs more tact to avoid being overlooked in the crowd. The man whose very presence commands attention can impress his will on others with apparently better grace than can the man of mean stature; whose entrance may seem obstrusive where that of the other would appear graceful.

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SECOND PRIZE ESSAY.

The Citizen.

BY HOMO (W J MCGEE, BUREAU OF AMERICAN ETHNOLOGY.)

I.

The standard of citizenship is indicated by individual and national success.

A nation is at once a group of individuals and a solidarity in which each individual is directly or remotely related to all others.

Considered simply as an individual, that person is best and most useful who is strongest, most active and longest lived, and who thus does most toward the subjugation of the lower powers of nature for his own good and the good of his children; considered simply as an integral part of a nation, that individual is best and most useful who contributes most to the state and thus promotes in the highest degree the welfare of his fellows; but in many respects the welfare of the individual and the weal of the nation are opposed—the physically and mentally perfect man may direct his strength against his neighbor and thus become an enemy of the nation, while the unselfish weakling may so far yield to his stronger neighbors as to become a slave.

The antagonism, or rather the reciprocal balance, between the individual and the nation is fundamental and inevitable; it is the balance of the rights of the one against the rights of the many, the balance between egoism and altruism. That nation or solidarity is strongest and best in which the rights and benefits of the one and of the many are most delicately adjusted—in which the common welfare is attained with the least sacrifice of individual welfare, and in which individual welfare involves the least possible sacrifice of common welfare; and considered as a citizen of such a nation, that individual is best and most useful who most justly divides his powers between selfish and unselfish ends, who does most for the nation with the least loss to individuality, and who maintains the strongest individuality with the least loss to the nation.

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II.

One of the tests of individual excellence is found in the power and persistence of nations; for if the individuals are good the nation flourishes and persists, while if the individuals are not good the nation suffers disruption or dies out, according to the excess or defect of individuality among its component members. Accordingly, the history of nations affords a means for determining the specific qualifications of the desirable members of the body, or of the good citizen.

The primitive nation was a family group, comprising an autocratic head with a number of subordinates. When enlarged, this group was a gens or clan, in which there were subgroups each dominated by a subhead, but all subordinate to the general head; and when still larger, the group sometimes became a tribe, in which there were major and minor subgroups of various orders, the whole composing a hierarchy; but this autocratic type of nation, whether patriarchic or hierarchic, has not stood the test of time, and has disappeared or is disappearing from the face of the earth. So, measured by this test, the constituent of an autocracy, whether he be head or subordinate, is not good.

In the survival of the fittest among nations, the patriarchies grew into hierarchies or suffered destruction; still later the hierarchies either grew into monarchies or suffered destruction, and in this way autocratic government gave place to monarchic government. At first the monarchy was absolute and closely akin to the hierarchy, but the absolute monarchies failed to stand the test of time and gave place to limited monarchies and republics. So, measured by the standard of power and persistence, the monarchy is an inferior nation, and the individual living under monarchic conditions does not best subserve the sum of public and private interests.

Just as patriarchy gave way to hierarchy, and hierarchy to absolute monarchy, and absolute monarchy in turn to limited monarchy, so limited monarchy is giving way to democracy or republicanism; already the foremost nation of the earth is a republic, and all other civilized nations are either republican or undergoing change in the direction of republicanism. So,

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according to the experience of the ages, the best nation is the republican one, and the best citizen is the individual adapted to life under republican conditions.

While the history of nations thus indicates the qualifications of good citizenship, it does not explain why republican citizenship is good, but the reason is easily seen: It is in a republic, above all other forms of government, that individuality is most highly developed and most widely diffused, and that interaction among individuals is most completely spontaneous. So it may be inferred from the history of nations that, other things equal, individuality and spontaneous interaction (or coöperation) are the highest excellencies of citizenship; and from these roots spring strength of character and patriotism.

III.

Whatsoever the individuality of the citizen and the spontaneity with which he coöperates in promoting general welfare, no citizen is good unless he is able to contribute more energy to the subjugation of lower nature and the promotion of humanity than is required for his own support; for if individuals give less than they take, the nation must quickly come to an end, while it is the nation in which individuals give most in proportion to their drafts that flourishes best and persists longest. Now, human life comprises alternate or successive periods of assimilation and dissemination. In infancy the individual is occupied in assimilating food and gaining bodily strength; in youth the individual assimilates knowledge and gains mental strength, and in adult life the energy thus stored up is disseminated for private and public benefit. So that individual is best for himself and for his kind who disseminates longest and (other things equal) most abundantly, and, accordingly, longevity and strength are among the most important qualifications of the individual.

Individual characteristics, including longevity and strength, are the joint product of inheritance and of acquisition (or education, using the term in the broadest sense).

Acquisition (or education) represents the joint product of individual effort and of coöperative activity on the part of the national solidarity, *i. e.*, the joint product of individuality and

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human environment. So largely is this true that civilized men are mutually dependent, and can acquire nothing worth acquiring, do nothing worth doing, indeed hardly continue to exist, without the aid and coöperation of their fellow-men. This cooperative element in determining individual characteristics is akin to the element involved in national existence and success, and the test thereof is found in the history of institutions, including governments; and the lesson of the history of institutions is the same as that of the history of nations—for republican institutions, tending at once to develop individuality and spontaneous coöperation, persist, while institutions not so constituted fail in the race for survival.

Inheritance is the product of the purely animal element in human existence, and under its laws there is a linear or temporal relation by which the solidarity among individuals is rendered more complete. Under the laws of inheritance no man lives unto himself alone, but unto his children and his children's children, and under his parents and his parents' parents; and the test of excellence—*i. e.*, of the ability to give out more than is absorbed of the energy required for the advancement of humanity—is found in the history of individuals and families.

In the beginning of human existence man was a plastic organism differing from other organisms in more symmetric and extended adjustment to environment—an adjustment of such character that when environmental conditions were insuperable the organism was modified or displaced, rather than destroyed like the higher or lower or fewer-sided organisms. Then in the struggle for existence the more plastic of the human genus survived, and thus plasticity was developed. So man came to be the most delicately adjusted to his environment of all organisms; and this delicacy of adjustment is the measure of development, or of excellence among the animate and inanimate things of the universe.

Many individual and racial characteristics, and all characteristics in some degree, represent the product of exercise; and by exercise in the adjustment of his character to his environment man came gradually to react on the environment, and later to modify environmental conditions, and eventually in a large measure to mold his environment to his will and control the lower powers of nature, and those individuals and groups who

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most perfectly molded their environment survived, while the less capable disappeared. In this way human control of lower nature acquired strength, and by natural selection strength was increased; the end sought required long continued individual activity, and by the survival of the fittest longevity was developed; the work required intelligence, and by constant exercise and inheritance mind was expanded and improved; the task required coöperation among individuals and families, and through the survival of the fittest altruism and patriotism bloomed and fruited. Thus the test of time shows that strength, longevity, intelligence, and altruism are most excellent among individual characteristics. These qualities are handed down from generation to generation under the laws of inheritance. If they are inherited in large degree, the individual and the family survive and the nation is strengthened; if they are inherited in small degree, the individual, the family, and the nation fail in the struggle for existence. So the excellence of an individual as a constituent of a nation is measured in part by blood or lineage, and the individual is not to be measured by himself alone, but by his ancestry and his probable progeny.

IV.

So the quality of good citizenship is indicated by the history of nations, the record of families, and the character of the individual. The history of nations shows that the good citizen must possess that individuality and patriotism which are fostered by and consistent with republican government. The record of families shows that the useful member of society must possess strength, that degree of vitality and physiologic plasticity which lead to longevity, as well as intelligence and altruism; and the study of individuals gives coincident indication.

From these general considerations the character of the good citizen is easily drawn: He should be strong of body and vigorous of mind; he should be plastic of body, so as to be quick to maturity, ready to recover from disease or wounds, and long to withstand the buffets of life; he should be adjustable of mind, in order to learn quickly, to turn readily from one occupation to another, to profit by experience, and to harmonize with his fellows; he should be industrious, for without industry there is

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no exercise, and exercise with inheritance makes the man; he should be sober and temperate, for otherwise his powers are dissipated; and he should have a line of ancestry of similar characteristics, for it is only through inheritance that the persistency of traits is assured. Coupled with these characteristics, there should go that altruism and patriotism toward which the development of civilization constantly tends.

With all these characteristics, man becomes a monarch in his own domain, a co-ruler with others of his kind over lower nature, a tower of strength against the perverse and the criminal, a support for the infantile, the aged, and the helpless, a friend of humanity, and a fit constituent of the state—he becomes that highest product of human development, a good citizen.

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THE DEVELOPMENT OF SCULPTURE.

BY J. D. MCGUIRE.

The sculptures of ancient Egypt are apparently older than those of any other country. The sculptures of America may be traced to extremely crude beginnings, yet their age is a matter of pure conjecture. So far as one can judge the mechanical execution of the carvings of Yucatan, for example, there would appear to be a greater similarity between them and the carvings of China than of relationship to Egyptian work. There is such an individuality about the sculpture of Egypt and of America and much of that of the Assyrians that one hesitates to attribute to them a common origin.

Marble, now so generally employed in supplying material for statuary, has been used for this purpose probably for the last 2,500 years, yet there are evidences that at a period 2,500 years earlier, the Assyrians and Egyptians made statues which evidenced great artistic ability and mechanical skill, and these statues were made from diorites and syenites, stones harder than marble.

Notwithstanding the many centuries that have elapsed since man first made sculptures of large size, the alterations in their surfaces have been so slight that we may by comparing them one with another trace the development of the art.

The methods now employed in producing sculptures and carvings are quite similar, due entirely to mechanical appliances, and are a great improvement over those employed in the production of ancient figures, for it will be seen that carving and sculpture have in their methods of growth approached each other from widely divergent beginnings.

The universal stone celt and the familiar American grooved ax and pestle show in the method of their production the first steps toward the development of sculpture. Formed to suit the taste of the mechanic making it, the work itself by which it was produced is not distinguishable from that appearing on all early worked stone.

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The polished surfaces are similar, as were the tools with which the work was performed. Sculpture accompanies a settled stage of society. On the other hand, carving is an art commonly found among the most savage races. The development of skill in carving is often encountered in the most unexpected localities and in places where no evidences are found of the sculpture of large figures. This difference appears directly traceable to the mode of life which savagery entails. Wandering during the hunter period from point to point with the change of seasons or as game or fruit became abundant or scarce, with no fixed dwellings and with no ability to transport heavy statues, there was no incentive to make them. Small carvings of bone, of ivory, or of wood appear common to every race. Their small size enabled them to be carried on the person, and an evidence that they were so carried is found in the holes generally bored through them for purposes of suspension.

The appreciation of symmetry of form or of the beauties of color is abundantly evidenced among the earliest traces of man's residence on earth, and is found to exist among all tribes and races of men, if we may judge by their implements and their manufactures.

When man first began to occupy continuously a particular site and to live in settlements, the size of statues, it is found, began to increase, as is evidenced by carved posts and wooden idols.

As settlements became more permanently established and more attention was paid to the construction of dwellings, the figures of wood would give place to the more pretentious, as well as more durable, stone statue, and nowhere is this more marked than among the ruins of Central and of South America. Among the many things influencing carving, there can be none more important than available material for tool-making. To cut diorite or granite successfully requires a tool metal as hard at least as steel, and there is no evidence of such metal possessed by the early races working such stone. Stone hammers can perform this work with little difficulty, and where statues of these stones are found the stone hammer is commonly met with. A natural inference would be that the hammer was the working tool, certainly until some one may suggest as simple an explanation.

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Nowhere has carving been carried to greater perfection than in the eastern world, and among eastern peoples none have excelled the Japanese and Chinese in the skill and artistic concept shown in their carvings of ivory and of jade, as well as of wood and of serpentine. The early chapters in the history of these carvings are very ancient, and to be fully appreciated should be examined in connection with an acquaintance not only of the physiognomy and costume but of the religions and the mythology of these countries.

Notwithstanding the artistic ability in carving evidenced by the Japanese and the great mechanical skill shown by the Chinese, neither nation appears to have been familiar with sculpture; for, although certain of their carvings are colossal, they are but carvings as distinguished from the art of sculpture.

The few statuettes due to Babylonian, Chaldæan, Assyrian, or Egyptian workmanship which have been discovered prove abundantly that these nations possessed artisans who were masters of the carver's art. If gaps be found in the development of the sculpture of a nation, investigation will show them probably to be due rather to some great political change than to a decadence of artistic skill. The gap existing in Egyptian carving and sculpture during several of the dynasties will be found to be due rather to a geographical change of the seat of government than to a decrease of art.

In most countries where sculptures are found it is apparently demonstrable that the method of their production has gone through regular stages of progression from extremely rude beginnings. It is impossible to prove that sculpture always began with the stage of incising outlines into the surfaces of large stones, as is generally supposed to be the case.

Conglomerates, the erosion due to the effects of alternate freezing and thawing, the carving done by sand blown by the wind, or, most common of all, the grinding of the silt held in suspension in water are all known causes of the carving of shapes and outlines, which would appear to afford a more plausible theory concerning the birth of sculpture than does the theory that sculpture owed its origin to the artificial incision of lines upon rock surfaces. A few blows given to a stone, shaped by any of the processes of nature referred to, would develop figures, and would, it is believed, soon lead to a deliberate and intentional shaping of stones.

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That such is the case appears to be shown by the finding of water-washed pebbles resembling animals or natural implements, often associated with the remains of the earliest periods of human existence, especially of those of the caves and shelters which were man's first dwelling places.

The North American Indians appear to have been as ignorant of the sculptor's art as was any race which had learned its first rudiments. Their sculpture appears never to have progressed beyond the production of a rude outline upon some bowlder, which was done by an implement that ate into the stone by a series of continuous blows. Of all the examples known of aboriginal American stone-cutting, it is doubtful whether there is a single one which could be designated even as low relief.

Among the rudest sculptures are to be reckoned the colossal figures found in Easter island, wrought from a coarse basalt or lava, representing the human figure from the waist up. They are shaped by the blows of a stone hammer delivered directly upon the surface of the stone fashioned. These statues have eyes, nose, mouth, arms, and hands shaped in the most primitive way, with but little regard to anatomical requirements. These statues leave one in serious doubt whether those who made them ever worked outlines as was done by the North American Indians, or imitated wooden figures as the Greeks are by some supposed to have done, or whether they were not rather a development and growth of statuary due to direct imitation of natural forms.

Returning to the American continent, there is found from Mexico far to the southward a remarkable sculptural development, evidenced in monoliths, in slabs carved in low relief, in figures carved in the round, and in mural carvings that are astonishing in their detail and which closely resemble the finish of the most elaborate Chinese work.

The slabs of basalt or of limestone intended for sculpture were first dressed down to a reasonably smooth surface by a process of hammering with a stone having a rounded edge or by an elongated pointed stone or with a hafted stone celt.

These American carvings or sculptures evidence a skill quite equal to that of the Egyptians of a similar mechanical condition of culture, and often present a distinct individuality.

The Assyrians present a striking instance of national individu-

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ality. The stone used is a grayish alabaster, extremely soft, slabs of which with winged figures carved on them and human-headed bulls of colossal size are common. The incised lines upon these figures show that the work has been done by a cutting process, probably with hafted tools, although it would be possible to produce the same effect with unhafted stone blades. Alabaster, being almost the only stone in the country, has naturally been the one most used, and its texture measurably influenced the art of Babylonia and of Assyria. To attempt to batter this stone would be to destroy it. The statuary of the most ancient Assyrian period indicates the cutting of diorites as early as 3000 B. C., as is evidenced by the discovery of two broken statues of this stone covered with cuneiform characters of an archaic type. Much of the technique and general character of these statues would appear to point to a common origin for them with some of those of Egypt.

The development of Egyptian sculpture may be followed with considerable accuracy through successive stages, beginning with the rudest and ending with the perfect round. Among the oldest efforts at sculpture by the Egyptians are said to be certain incised rocks similar to the stone-cuttings of the American Indians. There are, however, some well known carvings of small figures in limestone and in wood found in early Egyptian ruins that are considered to be of an age contemporaneous with primitive sculptures of the Nile valley.

These sculptures may be traced through the incised to the low relief, the intaglio, the high relief, the reserved, the colossal, and, finally, the round with considerable accuracy and apparently in chronological order. On the other hand, the small rude carvings of limestone, succeeded by larger squatting figures of solid form, and they in turn displaced by similar figures with more complete forms and increased size, until the colossal seated figure is reached, would indicate a possible if not a probable dual origin of the sculptures and carvings of Egypt.

The seals and cylinders of Assyria and of Egypt, of Greece and of Rome, fashioned by boring and by grinding, present art eras for these countries deserving of a study by themselves. The early Egyptian figures appear to have been produced by sawing, scraping, and grinding processes. The incised and relief sculptures appear to be produced by the hammer. This tool was

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early used on the statuettes of limestone, of diorite, and other hard stones, and as late as the reign of the second Rameses.

The archaic statues of the world appear commonly to be of hard stones and of tough ones, such as basalt, diorite, or granite, the surfaces of which could be dressed to any desired form by a battering process with a stone held in the hand, which was subsequently used for grinding the rough surfaces of the statue. There are drawings of Theban paintings in almost every illustrated work on ancient Egypt representing in minutest detail workmen carrying out the processes here suggested, the practicability of which the author has tested in experimental work.

These paintings do not appear to have been correctly interpreted, nor to have had sufficient consideration, judging by the improbable theories advanced by some archeologists to account for the methods by which South American and Egyptian sculpture was done.

The most popular theory to account for the cutting of these hard stones is that early races possessed the secret of tempering copper until it was sufficiently hard to cut them; others have advanced the theory of tools supplied with points and blades of diamonds. It has even been suggested that early races could soften stone for a time sufficiently for it to be worked before hardening again. M. Émile Soldi, an eminent French author, and himself a gem engraver, suggests that the work on early Egyptian statues was done with the steel pointing tool. Another theory suggests that silica could reduce these statues into form.

The peculiar dress seen on Egyptian statues—having long beards down on the breast and scarfs thrown over the head, the legs joined together, and arms at the side and attached to the body or crossed upon the breast—is often explained by asserting that the posture and dress are due to sacerdotal influences, and that the hard diorites and syenites were selected by the Egyptians for their sculptures in order to show that although the nation was in its infancy, it hesitated at no obstacle. About the time of Rameses the Second we find that the Egyptians abandoned the working of diorite and syenite and other hard stones and commenced to work extensively the Theban sandstone. The transition appears sudden. The surface work on statues appears no longer to be produced by the pitting hammer, but by the chisel blade of metal, probably driven by the mallet, as repre-

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sented in Theban paintings. The early Cypriotic statuary is of this sandstone, and appears contemporaneous with the later Egyptian art and is probably an outgrowth of it, and marks a step in advance in sculpture. The flat blade of the chisel and the gouge both appear to have been in use at this period, as well as the mallet. A close scrutiny, however, does not justify the positive assertion that stone tools had gone entirely into disuse, for many of the striations in the tool marks on the Cypriotic statues have a more scratched appearance than would be given by an ordinary chisel or gouge or by a tool of soft metal.

Here we see the old conventional headdress and beard of the Egyptian and the solid and massive figure give way to a free neck. One leg becomes slightly advanced in front of the other. The legs are no longer attached solidly together; they are slightly cut apart from each other. The arms are bent, with some freedom of action, at the elbow. The hand and wrist stand out a few inches from the body. That this freedom of action is due to the tool rather than to the art stage in which it was produced is evidenced strongly in the clinched fist. Were this freedom of action attempted in the harder stones, or especially in sandstone, with the shaping hammer, the danger of fracture of the arm at the wrist would be very great, and a free round neck would almost inevitably be broken off, because of the absence of the tenon formed of beard and scarf. In sculptures of the harder stones, angles are seldom seen; the fingers and toes are of equal length; the surface where cut in for eyes, nose, mouth—in fact, all lines are semicircular depressions due to the round surface of the shaping tool used.

The Theban sandstones show in a remarkable way the change of tool from the hammer to the chisel and mallet, enabling angles to be more readily cut and furrows of any desired depth to be made. Few examples are known in Egyptian art in which sculptures were made of marble, and when found, the piece of marble is usually small and finished as carving. Cyprus presents few examples of marble sculptures. About the sixth century B. C. we first find evidences of skill in marble-cutting exhibited by the Greeks; the hardness of metal about this period reached a point where the chisel and, above all, the principle of the file and rasp enabled marble to be worked at will, and con-

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sequently there was no longer any limit to the expression of free action in statuary.

The hammer had become obsolete, the chisel had supplanted it as a shaping tool, and the pointing tool was used with the mallet to cut away the rough blocks. There was no comparison between marble, as a medium for the expression of feeling in art, and any other stone theretofore used for sculptures. Marble made perfection possible in sculpture, the tools of steel made the treatment of marble as simple as carving, and thenceforth these two arts, mechanically considered, became one.

History does not treat of a time when carving was not, apparently, well known; tradition does not appear to approach much nearer to its genesis. Carvings were well executed during the period of man's early occupation of the caves of Europe, and most persons who have familiarized themselves with archeological research know the figures of fish or seal engraved on the canine teeth of large carnivora, and the bear, reindeer, musk ox, horse, mammoth, and other animals carved on reindeer horn implements or on plates of ivory, the figures of the animals being at times cut fully in the round and found in the lowest strata of the caves, under many feet of cave earth and stalagma, and associated with the bones of a quaternary and, at times, an arctic fauna. The similarity of much of this cave work with much of the Eskimo production of the present day has given rise to innumerable theories concerning a common origin for both people.

The carvings of wood and stone of the Hupa Indians, the little stone and bone figures of the Pueblo Indians, and the wonderfully carved pipes of the eastern North American Indians show a skill in carving possessed by a race who knew nothing of sculpture. The carvings of Mexico were above the ordinary, as is evidenced by the reputed skill with which the emeralds of Cortez were carved and the known excellence of Mexican carvings of quartz crystal, of jadeite, and of obsidian. To see them is to be convinced that those who made them were thoroughly conversant with the fracture of minerals. Carvings and sculptures, if any number be examined and carefully compared one with another, appear to have been produced in a similar manner, no matter what their origin or their age, whether from Fiji or the French caves. If the material be hard and tough, a stone

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tool batters it into shape; softer material is worked according to its texture. One may be cut, another scraped, or it may be that the saw is found most useful; but whatever method has been employed, it will be seen that it was the one best suited to the material.

The crude hand tool gave way to one with a handle, and in time its working capacity was increased by means of water, air, or electric power.

To attain an appreciation of the sculptor's art, at all thorough, would necessitate a study of the monuments of Egypt, the rock temples of India, the façades of the wonderful palaces of Cambodia and of Central and South America, as well as of the subterranean galleries of those countries.

With the Greeks the tool and the stone combined and made perfection first possible. To improve upon it would necessitate an improved tool and better material. It appears to have stood the test of two thousand five hundred years at least.

Ellicott City, Maryland.

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THE TALE OF THE KING'S DAUGHTER IN THE BESIEGED TOWN.

BY ALBRECHT WIRTH.

Shapur de Sassanide once laid siege to a stronghold of the northern Arabs in Hatra. This inaccessible eyrie in the desert of Hauran was renowned for its beautiful temple of the sun. Two Roman emperors, Trajan and Septimus Severus, had suffered a terrible defeat in a vain attack on its towering walls. It seemed as though the gallant Persian was to meet with no better fortune; however, it came to pass that one evening while riding on horseback toward the walls to scout, he was seen by the fair Nadira, the daughter of the king. She was well pleased with the handsome warrior. She took an arrow and attached to it a letter containing these words: "Your beauty has conquered my heart. If you will promise to marry me I will open to you the gates of the town." She shot the arrow to the very place where Shapur stood. The king read the message and sent his answer in the affirmative by means of the same arrow. The town is eventually taken. Nadira's father, Daijanes, is killed and the fair maiden becomes the bride of Shapur. The next morning she complains bitterly that she slept so very badly because she was pressed by a rose-leaf.*

"Oh, you tender dove," asks her Sassanide, "say, how did you live when your father held sway over Hatra?"

"Oh, I lay upon eiderdown and I fed upon wine and marrow and sweet honey."

"And you could betray a father so kind as this? Ho, guards! seize the faithless lady and bring hither a wild horse to trample her."

This is the relation of Tabari, Mirkhond, and other writers. Nöldeke, the German orientalist, thinks Tabari's source is the Greek tale of Nisus and Skylla. Nisus was king of Nisaia, in the country of Megaris, and he was besieged by Minos. Skylla,

* No doubt from a similar tale is derived Andersen's "Princess and the Pea."

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the daughter of the said king, fell in love with Minos, and was induced to steal upon her sleeping father and pull out his golden or, as others say, his purple hair, upon which his life depended. Nisus was assassinated and his city conquered. According to Higni (Fables, 242), he made way with himself. Now Minos was disgusted with Skylla's treason and would not take her with him. He threw her into the sea. According to some authors, she followed her beloved into the waves and took hold of his ship, but sinking down, she was changed into an animal. As a third set of writers has it, she was persecuted by her father and was changed into a sea-eagle. As to the opinion of Nöldeke concerning a Greek origin of the Persian tale, there is the objection that the tale of the affectionate king's daughter in the besieged city is also to be found in countries untouched by Greek influences. Thirty years ago there appeared the autobiography of an English adventurer, John Campbell. His father, a British officer, had been killed in the unfortunate expedition against Afghanistan in the forties, when the whole British army was wiped out in a mountain pass. The victorious Afghans had found the officer's child and had given him to a chief to bring up. When twelve years of age the boy escaped and wandered throughout the vast regions of Central Asia with varying adventures, until finally in India he came again to his father's people. On one occasion during his wanderings he heard the following narrative: A long time ago the Emperor of China besieged Dschealledin in the city of Gulguleh (near Bochara), whose name signifies confusion. The attempt was for a long time unavailing. At last the daughter of the besieged sultan noticed the emperor in all the magnificence of his armor riding toward the walls, and lost her heart to him. She wrapped a letter around an arrow and shot it toward the emperor's tent. The letter said: "Great and beautiful prince, if you promise me that I shall be your bride I will disclose to you a plan by which this city may be brought into your power." On the promise of the emperor she advised him to drain the river which supplied the city with its drinking water. The Chinese did this, and attacked and destroyed the citizens, reduced as they were to extremity by thirst. On their return toward China the princess complained of the fatigue of riding on horseback, for which she was too delicate, as she had passed her whole life on silk and down. The conqueror

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commanded that the weakling should be crushed between two millstones, "for," said he, "a daughter who has betrayed her father will also be a treacherous wife."

A similar motive is found also in the story of Moses as taken from Jewish sources by the Hellenist Aristobulus, and after him by Syrian and Byzantine writers. By command of Pharaoh, Moses conducts a war against the Ethiops and besieges for ten years the city of Saba, which is protected on one side by the Nile, on the other by a desert infested by serpents, on the third by a huge wall, and on the fourth by a numerous host of defenders. Moses procures an immense number of storks to exterminate the serpents, and then marches against this side of the city, which is now unprotected. And now it might be expected that he would take the city by force, but Adonia, the Queen of Ethiopia, fell in love with the approaching commander and agreed to betray the city to him on condition that he should marry her. Moses fulfills his promise to marry the queen, but has no further communication with her. The queen is angered and they separate.

Somewhat similar is the Norwegian tale of which Madame Flygaré-Carlén availed herself in the "Maiden's Tower." When Waldemar Atterdag, the famous conqueror of the thirteenth century, laid siege to Tromsó he is said to have made his way in disguise into the city as a spy, a feat which appears in many sagas. The emperor's daughter promised him that she would open the gates of the town in the night on condition that he should spare her father's house. It so happened the city was taken, but the triumphant Waldemar leaves the maiden behind him. After the withdrawal of the enemy her father was obliged by the citizens to pass sentence upon his own child and to wall her up alive.

I shall in the following remarks try to give an explanation of those sagas. The fair, youthful hero is the sun. The castle to which he lays siege is the unconquerable castle of the clouds; the daughter of the lord of the castle is the lightning; the maiden enamored of the conqueror expresses her longing by arrows and is answered by arrows. She destroys her own father's town just as the lightning shatters the cloud from which it took its origin. As soon as the waters of the sky have vanished the Sun God wins and sweeps away on his steeds. But what becomes of

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the liberated maid to whom he swore fidelity? She was lying softly and tenderly on the eiderdown of the cloud, feeding on its marrow and drinking the heavenly nectar. She cannot stand the riding on fiery horses; she pulls out the purple and gold hairs of her father,* *i. e.*, the cloud brings no danger without the lightning. The tender maiden, the arrow-shooting virgin, is crushed by the sun, the fiery mill (Kuhn, Descent of Fire, p. 115), or she is trampled by fiery horses. The tempest slowly sinking into the ocean, as if appealing to the sea-girt Greeks, its child, the lightning, is drowned in the flood, as the dark storm-cloud passing over is buried in the gloomy night.

II.

In one version Nadira's father is called Satrana. Now, this was also the name of the lord of the miraculous castle of Chavarnac, which was reputed to have been built near Hatra. According to Mirkhond, the castle was made of black stones. Sinimar, who erected it, declared, however, that if his wages had been more liberal he would by his magic craft have built a castle that would have turned according to the sun, and would have appeared in red color in the morning, in white at midday, and in yellow in the evening. Now, there was a hidden stone in that castle. If this stone were taken away, the whole building would fall. In order that this secret should never be revealed, the king of Hatra caused the poor architect to be thrown down from the top of the wondrous castle.

The architect is the sun. If he draws water, there appears a black castle made of the vapors of the clouds. The castle is adorned with different colors, according to the position of the sun. The architect is dragged down from the top—*i. e.*, the sun is hidden by the covering of the clouds or he disappears entirely behind the horizon.

III.

Sevechorus the Chaldean, by the advice of his sorcerers, causes his daughter to be imprisoned in a tower, for it had been prophesied to him that he must guard himself from a son that might be

* The golden hairs of the king are found again in the three golden hairs of the devil in Grimm's Children's Tales.

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born to her. The maiden has a son by an invisible being. The son is carried down to the earth from the top of the tower by an eagle. The descendant of kings wanders through the world and holds sway later on over Babylon. Again there is a wedding of the Sun God, and there is, if not the original, at least the characteristic type of the tale of Danæ—we might add, the saga of Rapunzel in the doorless and windowless tower. Rapunzel draws the prince up to her by her hair, just as the amber-perfumed Rugabe draws the Persian Sal in the poem of Firdusi. Now, the hair, as Mr. Wolfskehl has well explained in a recent paper, is symbolic of the cloud, and there can be no doubt that a prince who temporarily becomes blind and then receives his sight again is intended to represent the sun.

If the sun "drawing water" symbolizes a tower reaching from earth to sky, Nimrod, who pierces the sky by his arrows, erects the tower of Babel. The tower is destroyed, according to a later legend, by the winds. It is not feasible to trace this tower back to the temple of Baal, us many scholars have tried to do, for the tower reaching into the clouds is to be met with quite often. Its destruction by storm occurs also in Mexican folk-lore. It is the destruction of the column of clouds by winds purifying the sky.

Closely akin to the Babylonian saga of Sevechorus is the tale, likewise Babylonian, of Orchamos, who walls up his daughter in a tower because she is loved by the Sun God. According to Ovid, the king Orchamos is distinctly opposed to the ruler of the sun horses. Many a scholar has been at a loss in regard to Orchamos, and until now the puzzle has not been solved. As I am told by a learned acquaintance (Mr. Chait, of Wilna), it seems that the name is identical with another one occurring in the Babylonian Talmud (Pesachim, 119). It is said Jurkami, the prince of hail, had aided the three men in the fiery furnace. Jurkami has a conversation with the angel Gabriel, and he is represented as an important demon. The prince of the hail is a very good analogue of the Tempest God, the enemy of the sun.

IV.

A descendant of the Babylonian saga is a Christian legend, the tale of Irene.* A king hides his daughter in a huge tower,

*See Wirth, Dame in Christlichen Legenden, Wien, 1892.

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fearing, as is expressly observed, that the Sun God might damage her. This edifice was erected in the field of Nair.* Through the guarded walls and locked doors there penetrates a heaven-sent man and speaks to the fair maiden and converts her to the Christian faith, an addition, of course, to be charged to the account of the Christian romancist. When the king became aware of the violation of his daughter's seclusion he threw her under the feet of wild horses. This punishment seems to be not uncommon in Persia. It is mentioned also in an epigram of Firdusi. Nair, the castle of Irene, is identical with Navid or Nod, where Cain settles down, and must be traced back to the Nairi mountains, extending between Nisibis and the plain of Babel. The name of the home of Irene is Magedon—*i. e.*, Mygdonia, a country which is likewise in the neighborhood of Nisibis.

It is curious enough that a proper name occurring in the cuneiform many centuries before Christ should be retained until the time of the later Sassanides, in whose epoch the Christian romancist composed the legend.

*Thus the Parisinus græcus, 700.

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THE CEREMONIAL YEAR OF THE MAYA CODEX CORTESIANUS.*

BY MARSHALL H. SAVILLE.

Students of aboriginal American paleography have reason to be thankful for the superb edition of the Codex Cortesianus which has lately been published in Madrid, where the original manuscript is preserved in the Royal Archeological Museum. It has been reproduced in colors in the original form, which is folded like a fan or screen and used on both sides.

This codex presents several features not found in the other existing codices which have been published, and the object of this paper is to make known the discovery of the Tonalamatl, or ceremonial year, which I observed while making a brief study of the codex a few months ago. Realizing the importance of making known anything which bears upon the contents of the codices, I shall simply confine myself to this one feature and shall not attempt a discussion or explanation of that which accompanies this time series.

As is well known, the Mayas of Yucatan had in their chronologic system a sacred year consisting of 260 days. This was recorded by numbering the 20 days of the month from 1 to 13 and in constant repetition of the same numbers, twenty of these series forming a sacred year or year within a year. This year has been found by Mr. F. H. Cushing among the Zuñis, who call it the kernel of the year. According to De Landa the year commenced with Hun Imix or 1 Imix. This statement has been misinterpreted by some as referring to the solar year, but the following observations show clearly that the sacred year is meant.

The pages of the codex have been numbered for convenience of study, and on unfolding the book so as to observe the sequence of glyphs and pictures I found that pages 31 to 38 presented a similar appearance in that each page was divided in the center by a line running transversely across the page. Each half page

* Read before the A. A. A. S., in Brooklyn, August 21, 1894.

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has two columns of day symbols, accompanied by numerals, one column being at the left margin of the page and the other a little to the right of the middle. On each half page are two scenes or pictures, with probable explanatory glyphs above occupying the space to the right of each column. The upper edge of the manuscript is somewhat destroyed, the upper glyphs of each column of the first page (31) being obliterated. The upper glyph of the left-hand column of the second page (32) is also destroyed, but the second column is headed by 4 Kan. The first glyph is destroyed on the third page (33), but the top glyph of the second column of the page is 6 Cimi. The upper glyph of the first column of the fourth page (34) is 7 Manik and of the second column 8 Lamat. We thus see the order in which the series is to be read—not as one naturally would expect, considering each page by itself, but by spreading out the whole series of eight pages and reading from the upper left-hand corner of the first page (31) from left to right, taking all of the upper day glyphs in sequence. Counting back from 4 Kan of the second page (32), the upper glyph of the first column would be 3 Akbal; of the second column of the first page (31), 2 Ik, and the top glyph of the series at the upper left-hand corner 1 Imix, the first day of the sacred year.

Continuing the count of the day glyphs through the several pages, it is found that they are numbered in order up to 13 Ben, which is the upper glyph of the first column of the seventh page (37). The upper glyph of the second column of this page is 1 Ix; that of the first column of the eighth page (38) is 2 Men, and of the second column is 3 Cib. This completes the upper series of glyphs, and I find that the next day of the calendar, which would be 4 Caban, is the top glyph of the first column of the lower division of the first page (31), and the series continues through the top line of glyphs through the eight pages, as in the upper division, the top glyph of the second column of the eighth page (38) being 6 Eb. The next day, 7 Ben, is the second glyph of the first column of the upper division of the first page (31). The series runs through the second line of glyphs, and from there to the second line of the lower division, then to the third line of the upper division, and so on continuing alternately in this manner to the lower right-hand corner of the eighth page (38), which reads 9 Cib. The number of days enumerated

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on these pages is 256. Turning to the next page (39), I find the page to be divided in the middle, with a glyph at each corner, numbered respectively, at the lower left-hand corner, 10 Caban; the lower right-hand corner, 11 Ezanab; the upper right-hand corner, 12 Cauac, and the upper left-hand corner, 13 Ahau. These last four glyphs, which complete the 260 days of the sacred ceremonial year, follow the sinistral ceremonial circuit of the Mayas given by De Landa of the four cardinal points—south, east, north, and west.

In conclusion, this discovery establishes the following facts:

First. A time series of 260 days, divided into thirteens, beginning with 1 Imix, and making a sacred ceremonial year.

Second. That the glyphs in this part of the codex are to be read from left to right through a series of pages in the alternating manner already indicated.

Third. That the pictures and glyphs accompanying this time series explain ceremonies which were to take place at intervals during the ceremonial year.

Fourth. The coincidence of a sinistral circuit of glyphs perhaps indicate the quarter in which ceremonies were to be observed during the last four days of the year, as no pictures accompany these glyphs.

The least this paper can accomplish will be to indicate a fruitful source of investigation for students of the Maya codices in studying the pictures and glyphs associated with this time series.

Page 31.		Page 32.		Page 33.		Page 34.	
1	2	3	4	5	6	7	8
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.
7	8	9	10	11	12	13	1
Ben.	Ix.	Men.	Cib.	Caban.	Ezanab.	Cauac.	Ahau.
13	1	2	3	4	5	6	7
Chicchan.	Cimi.	Manik.	Lamat.	Muluc.	Oc.	Chuen.	Eb.
6	7	8	9	10	11	12	13
Caban.	Ezanab.	Cauac.	Ahau.	Imix.	Ik.	Akbal.	Kan.
12	13	1	2	3	4	5	6
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.
5	6	7	8	9	10	11	12
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.
11	12	13	1	2	3	4	5
Ben.	Ix.	Men.	Cib.	Caban.	Ezanab.	Cauac.	Ahau.
4	5	6	7	8	9	10	11
Chicchan.	Cimi.	Manik.	Lamat.	Muluc.	Oc.	Chuen.	Eb.

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4	5	6	7	8	9	10	11
Caban.	Ezanab.	Cauac.	Ahau.	Imix.	Ik.	Akbal.	Kan.
10	11	12	13	1	2	3	4
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.
3	4	5	6	7	8	9	10
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.
9	10	11	12	13	1	2	3
Ben.	Ix.	Men.	Cib.	Caban.	Ezanab.	Cauac.	Ahau.
2	3	4	5	6	7	8	9
Chicchan.	Cimi.	Manik.	Lamat.	Muluc.	Oc.	Chuen.	Eb.
8	9	10	11	12	13	1	2
Caban.	Ezanab.	Cauac.	Ahau.	Imix.	Ik.	Akbal.	Kan.
1	2	3	4	5	6	7	8
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.
7	8	9	10	11	12	13	1
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.

Page 35.		Page 36.		Page 37.		Page 38.	
9	10	11	12	13	1	2	3
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.
2	3	4	5	6	7	8	9
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.
8	9	10	11	12	13	1	2
Ben.	Ix.	Men.	Cib.	Caban.	Ezanab.	Cauac.	Ahau.
1	2	3	4	5	6	7	8
Chicchan.	Cimi.	Manik.	Lamat.	Muluc.	Oc.	Chuen.	Eb.
7	8	9	10	11	12	13	1
Caban.	Ezanab.	Cauac.	Ahau.	Imix.	Ik.	Akbal.	Kan.
13	1	2	3	4	5	6	7
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.
6	7	8	9	10	11	12	13
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.
12	13	1	2	3	4	5	6
Ben.	Ix.	Men.	Cib.	Caban.	Ezanab.	Cauac.	Ahau.
12	13	1	2	3	4	5	6
Chicchan.	Cimi.	Manik.	Lamat.	Muluc.	Oc.	Chuen.	Eb.
5	6	7	8	9	10	11	12
Caban.	Ezanab.	Cauac.	Ahau.	Imix.	Ik.	Akbal.	Kan.
11	12	13	1	2	3	4	5
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.
4	5	6	7	8	9	10	11
Imix.	Ik.	Akbal.	Kan.	Chicchan.	Cimi.	Manik.	Lamat.
10	11	12	13	1	2	3	4
Ben.	Ix.	Men.	Cib.	Caban.	Ezanab.	Cauac.	Ahau.
3	4	5	6	7	8	9	10
Chicchan.	Cimi.	Manik.	Lamat.	Muluc.	Oc.	Chuen.	Eb.
9	10	11	12	13	1	2	3
Caban.	Ezanab.	Cauac.	Ahau.	Imix.	Ik.	Akbal.	Kan.
2	3	4	5	6	7	8	9
Muluc.	Oc.	Chuen.	Eb.	Ben.	Ix.	Men.	Cib.

Page 39.	
13	12
Ahau.	Cauac.
10	11
Caban.	Ezanab.

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VARIATIONS IN THE HUMAN SKELETON AND THEIR CAUSES.

BY DANIEL G. BRINTON, M.D., LL.D., D.SC.*

The purpose which I set before me in the present paper is to correct what I conceive to be a prevalent error in physical anthropology. In this science of late years we hear and read a great deal of "retrogressive anomalies," of "atavistic traits," of "pithecoid," and "simian" and "lemurian reversions." Any unusual structural variation is at once claimed as the inexplicable apparition of some ancestral type, the ghost of some grandfather a thousand times removed, but ever inopportunely popping up in the present.

What I wish to show is that we have no right to assume that any such variation is a *reversion* until we are unable to show that it is a *result*. Whenever a present mechanical or physiological or pathological condition offers a sufficient cause for the variation, it is illogical to seek further. The more so, that all such words as "reversion" and "retrogression" take for granted hypotheses which have not yet been established beyond doubt. A variation, I maintain, is a *terminus ad quem*, a product of definite and present activities moving under fixed laws toward a calculable result. The terms "arrest of development" and "degeneration" offer no explanation because they refer to effects, not to causes. Variation is the rule, not the exception, in organic forms. Not its presence, but its absence, is the real problem of biology, and also of physical anthropology. Not that the white man has become white and the black man black, but that each remains so, is the true puzzle.†

* Read before the American Association for the Advancement of Science, in Brooklyn, August, 1894, Section of Anthropology.

† "The Discontinuity, of which Species is an expression, has its origin, not in the Environment nor in any phenomenon of Adaptation, but in the intrinsic nature of organisms themselves manifested in the original Discontinuity of Variation." Wm. Bateson, *Materials for the Study of Variation*, p. 567 (London, 1894).

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Taking up one small, but typical branch of this large question, my purpose is to show that many of the traits of the skeleton usually called simian or pithecoid, and explained by "reversion," are merely the results of mechanical or functional processes; further, that such traits are not racial in anything like the degree attributed to them, but are found in all races subjected to the influence of these processes, and that a primal difference of race based on such criteria is as unfounded an assumption as to infer, to quote a comparison of Virchow, that the African with his black skin and woolly hair must be descended from a black sheep or a poodle dog with these characteristics. When we find certain variations in the human skeleton bringing it closer to that of the gorilla, it does not in the least prove that man is descended from the gorilla, and that this is a case of reversion, but that in this instance he has been subjected to certain influences similar to those which have produced these traits in the gorilla. That is all.

With these preliminary sentences to show what I am aiming at, I proceed to my theme.

The composition of bone has always been the same. It has not appreciably varied since the earliest geologic time.† Roughly speaking, it contains one-third inorganic matter and two-thirds organic matter, though these proportions vary slightly in different bones and different animals, and considerably in certain diseases. The organic matter is called by the French anatomists *ossein*, which is a convenient term. It is a common error, which I observe in some archeological works, to suppose that the older a bone is the less organic matter does it contain.* So far is this from being the case that Dr. Buckland, the geologist, made a fairly rich soup of the bones of hyenas taken from the preglacial caves of southern England.‡ On the other hand, bones less than a century interred may have no ossein whatever.

In studying variations it is very essential to understand thor-

*"La nature du tissu osseux n'a pas varié depuis les temps les plus reculés." Pouchut et Beauregard, *Traité d'Osteologie Comparée*, p. 29. (Paris, 1889.) Post-mortem changes, as the increase of fluorine or the substitution of inorganic materials, are, of course, not considered.

†As Dr. Joseph Jones, *Antiquities of Tennessee*, p. 71, when he assumes the proportion of organic matter as a test of antiquity.

‡Quoted in Luther Holden, *Human Osteology*, p. 3.

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oughly the growth of bone, the osteogenetic process. This acts radially from certain points called "centers of ossification." These are divided into primary and secondary. The former are few in number in each bone; but the latter may be indefinitely multiplied, giving rise to numerous anomalies. Secondary centers may, moreover, rise into activity long after the primaries have ceased, as in the case of synchondroses and sutures ossified in early life, which open later and new bone formation begins again.* By them is also explained the occurrence of supernumerary bones, as the episternals, surplus ribs, vertebræ, etc. It has been rendered extremely probable by the researches of Dr. Dareste that many anomalies of this kind are produced by physical influences on the embryo, and some he has been able to bring about experimentally.

I have not the space, however, to enter into these interesting points further, and shall therefore proceed to call your attention to a few of the chief causes of variations which we find in the human skeleton. The first is—

Sexual Variation.

From the remotest ages and in all races of men the skeleton of the female is somewhat smaller than that of the male. This is also true of nearly all other mammals and of birds. The bones are rather lighter and more delicately shaped in a woman, the clavicle is less curved and longer in proportion to the humerus, and the pubic rami meet at a more obtuse angle. The last mentioned is the only positive feminine distinction. Even this leading sexual criterion is obliterated in some branches of the human race, as, for example, among the Indo-Chinese, where the rami of the *os pubis* of the male meet at about the same angle as those of the female (Hervé). In spite of much that has been written about the fetal traits and undeveloped and semi-pithecoid characteristics of the female skull and skeleton, I will challenge any anatomist to determine the sex when the pelvic bones are absent. Sexual variations are mainly explained by the laws which govern the process of reproduction in the two sexes, and need no other or more recondite hypothesis.

The second class which I shall name is

* See *Zeitschrift für Anthropologie*, 1887, p. 206.

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Lateral Variation.

I have found little about this in the writers, either the anatomists or the anthropologists, though its prominence cannot be gainsaid. If you examine closely any skeleton you will find a number of small and often some very marked differences between the bones of the right and left sides. This is asymmetrical, lateral variation. The only field in which it has been carefully studied is cranial asymmetry, where the two lobes of the brain being different in size the skull has been molded irregularly on its two halves. This is not merely common, it is the rule, and the majority of human heads are thus asymmetrical, illustrating how potent are the factors of lateral variation.*

Lateral variation depends upon dextral and sinistral preference, a phenomenon extending very widely over the animal kingdom down even to the snails, who have no hands, but who manifest it in the construction of their shells. No satisfactory explanation of it has yet been offered; but that the much larger use of the one side over the other would affect the bony structure is obvious. One important suggestion to anthropologists is here in place. In describing a homologous bone, it should always be added whether it is a right or a left, for this is often of weight in the argument. Perforation of the fossa olecrani of the humerus and the torsion of the humerus, for instance, vary considerably with the two sides of the body, as they also do with the sexes, being more frequent in the female, and on the left side, according to Broca, though some series, as those from the Salt River valley, do not support his view.

Both these causes of variation are, however, of minor importance compared with that from

Mechanical Function.

This may be either in the directions of increased or diminished function; and first of increased function.

It is well known to surgeons that hyperostosis arises from increased function. There is an interesting specimen in the Lon-

* "La plupart des crânes humaines sont asymétriques. L'asymétrie est manifeste dans la moitié des cas." F. C. Ribbe: *Etude sur l'Ordre d'Obliteration des Sutures du Crâne dans les Races humaines*, p. 159. (Paris, 1885.)

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don College of Surgeons where the bones of the upper extremity are notably enlarged. They belonged to a paraplegic man, who for years used his arms for progression.* In perfectly healthy subjects the circumference of the humerus in its upper third is sometimes one-third greater than in the lower, owing to the unusual development of the pectoralis major during life. Interesting examples of this from ancient Venezuelan skeletons are adduced by Dr. Marcano.†

Flattened or platycnemic tibias have often been mentioned as a pithecoid reversion, and also as a racial trait. They are neither. Virchow has abundantly shown that they are produced in any race by the prolonged use of certain muscles, either in constant trotting, in prolonged squatting, in carrying burdens, or in the use of peculiar foot-gear. The proof that it is acquired is that it is never found in the tibias of young children.‡

To the same cause we must assign the increased or diminished torsion of the humerus, the anterior incurvation of the ulna below the sigmoid cavity, and the increased angle of retroversion of the head of the tibia; all of which have been catalogued as simian reversions. In Alikuluf skeletons from Tierra del Fuego, Martin found the latter angle increased from 7°, which it is in the European, to 20°, but very justly explains it by the habit of these islanders of crouching around their fires for hours every day.§ The pilastered femur has not been urged as a simian trait, but much has been made of it as a racial criterion. It is enough to say that the most extraordinary examples of it are those belonging to modern Indians obtained by Mr. Clarence Moore in Florida, and now in the Academy of Natural Sciences, at Philadelphia. The pilaster is nothing more than a proof of powerful femoral muscles, and has nothing to do with race.

The perforation of the olecranon fossa of the humerus, once claimed as allying the lower human races with the apes, and later as a racial criterion in the human species, has now been abandoned as either, and is regarded by unprejudiced anatomists, in

*Samuel Wilks: *Pathological Anatomy*, p. 91.

† D. G. Marcano: *Ethnographie Précolombienne de Venezuela*, p. 43.

‡ See further the remarks of Dr. W. Matthews in his *Memoir on the Human Bones of the Hemenway Collection*, p. 224.

§ R. Martin: "Ein Beitrag zur Osteologie der Alikuluf," in *Vierteljahrschrift der Naturforsch. Gesell. in Zurich*, 1892.

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the words of Dr. Washington Matthews, as "the result of some mechanical cause connected with occupation."*

An interesting effect of mechanical function has reference to cranial and facial form. There is a distinct correlation between prognathism, dolichocephaly, and early synostosis of the sagittal suture. The relation is not absolute because other factors enter into the problem, but it is quite recognizable. I take it that this arises from the greater development of the temporal muscles required in mastication by a prognathic jaw. These are attached to the temporal and parietal bones, and their action brings about a bilateral compression of the head, developing an opposed increased synostotic activity along the median line, followed, of course, by anterior and posterior pressure of the cerebral contents and consequent dolichocephaly.†

We find something quite analogous in the dog. He is not born with the median ridge of the skull common in other carnivora, and at birth the temporal muscles extend only partly up the side of the head, but by constant use of the jaws they rise further up, and the ridge is developed.

It is well known that the development of these muscles and its consequences have been claimed as simian traits. The most striking example is that of the New Caledonians. They are not a low race, yet it is precisely in skulls from that locality, now in the Museum of the University of Pennsylvania, that the late Dr. Joseph Leidy and I found the highest alveolar prognathism that either of us had ever seen, and the result in question, therefere, was a purely mechanical one and not at all a reversion.

Another consequence of complex mechanical action is the proportion which the face bears to the head. On his divisions of chamæprosopic, broad-faced, and leptoprosopic, narrow-faced, Professor Kollmann, of Basle, has founded his classification of human races; but in close families, such as the Veddahs of Ceylon, both are found, and we are forced to agree with Dr. R.

* *Memoir on the Human Bones of the Hemenway Collection*, p. 218.

† This is independent of the close relations which exist between prognathism and the position of the zygomatic arches and the occipital foramen. Here also we have an instance of present physical and mechanical action, leading to a simian analogy. Compare Hovelacque and Hervé, *Precis d'Anthropologie*, p. 69.

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Martin that these are "termini of cranial variations only, proceeding in two directions, and not at all primitive types."*

Passing now to diminished mechanical function and its results, I shall confine myself to a single example out of the very many which present themselves. The example I select is the teeth. The full development of the third molar in some prehistoric maxillaries and in the Australians has been pointed out as a survival. In fact, its late appearance and diminished vitality in what are called the higher races are purely mechanical results, their orthognathic jaws rendering it practically useless, so that today in artificial dentures it is omitted.

One effect of this diminished or diverted function is that its tubercles are usually reduced to three instead of being four or five; yet the presence of a tritubercular crown in certain other molars has been advanced by a distinguished American scientist as a sufficient proof of a "lemurian reversion" in human dentition—the more so, he argues, as it does not occur in the anthropoids. What appears to be a complete answer to this has been made by the able French anthropologist, Topinard, which he sums up in these words:

> The contrast between the frequency of this apparent reversion in man and its absence in anthropoids proves merely that the two have not been subjected to the same tendencies, which can refer only to their respective methods of alimentation. This seeming retrogression in man is merely an adaptation of utility, and the inference which Professor Cope has drawn from it is, therefore, not legitimate.†

An even larger field of variation in the human skeleton is that offered by

Deficient Nutrition.

Perhaps this is seen most palpably in the variations of stature within the same race and people. Dr. Collignon, who has made such admirable anthropological studies of the population of France, finds the diminution of stature in certain districts explainable by one word, *la misère*, the lack of proper and sufficient alimentation.† Virchow, discussing the dwarfishness of the

* In *Archiv für Anthropologie*, 1893.

† Paul Topinard in *L'Anthropologie*, 1892, p. 707.

‡ Dr. R. Collignon, "Etude des Populations Françaises," in the *Association Française pour l'Avancement des Sciences*, 1892.

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Lapps as compared with their cousins, the Finns, pronounces them *Kümmerformen*, products of wretchedness. The shortest of the Bushmen are also the most miserable—those living amid the barren sands of the Kalahari desert. It is not argued that misery alone is the cause of inferior stature, but it is one of the causes, and a potent one.

Where we find it we find also other variations from the same cause. The sternum of a Bushman is often not as much developed as that of a new-born infant with us;* true microcephaly is common in poorly nourished communities, as are spina bifida, rickets, and other diseases proceeding from osseous innutrition. There is nothing racial, still less pithecoid, in any of these traits. They flow from obvious and present conditions.

This is also true of those small, intercalated bones which develop or persist in various sutures of the cranium and face, the epactal bone, the ossa Wormiana, and the recently observed *ossicula mentalia* of Mies.† The presence of these is to be understood as an evidence of deficient osteogenetic power, not its excess, as is sometimes stated. They are very generally associated with other signs of defective bone structure, as bifid sternum, perforation of the fossa olecrani, carious denture, and the like. They are most numerous in pathologic cases. Holden found over a hundred Wormian bones in the skull of a hydrocephalic infant,‡ and Hyrtl over three hundred in that of a cretin.§ They are formed from multiple secondary centers of ossification because the primary centers were too feeble to supply the needs of the system.

The epactal is really a large Wormian bone, and the attempt to assign it an ethnic value under the name of *os Incæ*, made

Zeitschrift für Ethnologie, 1890, p. 441. The effect of long-continued limited nutrition may bring about diminution of stature, symmetrical and without pathological traits. Thus the extinct elephants of Malta became toward the close of the life of the species quite small. A small but vigorous breed of horses is found where food is scarce. In the Canary Islands the oxen, the horses, and the men all become smaller on the smaller islands (de Varigny). This explains the origin of the dwarf races, the Negritos of the Spice islands, the Orang Pangang of the peninsula of Malacca, and the Pygmies of central Africa.

† See *L'Anthropologie*, 1893, No. iv.

‡ *Human Osteology*, p. 103.

§ *Lehrbuch der Anatomie*, p. 306.

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by Von Tschudi, fails upon examination. It is found, with equal or greater frequency, among the ancient Arizonians of the Salt River valley, and Dr. Washington Matthews has inferred therefrom some closer relationship between these two peoples than that of race.* But the simpler and more likely explanation is that in both instances we have a people subsisting upon a similar inadequate or at least non-osteoplastic alimentation, leading in each to similar semi-pathological variations from the norm.

This is well illustrated in the remarkable frequency of pathological exostoses in both peoples. Among the Saladoans they are found in about one-third of the subjects, a percentage nowhere equalled, so far as I know, except by the ancient skeletons from the vicinity of Lima, described by Virchow.†

It is a singular instance of the misinterpretation of ethnic anatomy when Professor Hervé, of the School of Anthropology of Paris, says that the presence of these Wormian bones and the complexity of the cranial sutures are a measure of the rapidity of brain development, and consequently a criterion of the position of a race in the scale of humanity. It is merely an indication of osteogenetic vigor, or the reverse.‡

Another interesting fact comes in in this connection. Virchow has convincingly demonstrated that anomalies of the bony structure in man are constantly and markedly greater among uncivilized than among civilized peoples, and consequently greater among ancient races than among those now living.§ This is in accordance with what holds good of the lower animals, for Bateson has shown by an extensive collation of evidence that Darwin was quite in error in maintaining that variation is greater in domesticated than in wild animals.|| In man its increase in

*See Dr. Matthews' article, "The Inca Bone," in the American Anthropologist, October, 1889; also his remarks on *Human Bones of the Hemenway Expedition* (Washington, 1893). The epactal or *os Incæ* arises from a secondary center of ossification which appears in the squamous portion of the occipital bone. Its genetic history is in all respects that of an *os Wormianum*.

† Ueber krankhaftveränderte Knochen alter Peruaner, in *Preuss. Akad. der Wissenschaften*, 1885.

‡ See Hovelacque and Hervé, *Precis d'Anthropologie*, p. 59.

§ See *Zeitschrift für Ethnologie*, 1891, pp. 54, 56, etc.

† Wm. Bateson, *Materials for the Study of Variation*, p. 572.

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the savage state evidently depends upon fluctuations in the food-supply and frequent changes and excessive stress of mechanical function as the prime factors.

These brief suggestions will, I hope, be sufficient to place before you clearly another and, I believe, a juster method of studying the ethnic anatomy of the bones than you will find in ordinary treatises. The polygenists and the reversionists seem opposed to admitting the action of familiar natural causes. Because a human variation is pithecoid they illogically jump to the conclusion that it is pithecogenetic. Instead of looking on it as the natural result of an existing tendency, they claim it is a return to some primitive type. In fine, instead of accepting the nearest and plainest explanation of an observed fact, they put forward one in itself absolutely inexplicable and carrying with it a tissue of hypotheses, not one of which is more than a surmise.

DISCUSSION.

Professor Cope remarked that the paper of Dr. Brinton is interesting as bringing before the Section what is known or supposed to be true of the origin of certain peculiarities of the skeleton and dentition in some human races. Professor Cope insisted, however, that the demonstration of the mechanical origin of a given peculiarity by no means precludes that such peculiarity may not be an inheritance from or reversion to pithecoid ancestors. It is the belief of many paleontologists that all of the form-characters of the vertebrate skeleton and, for that matter, of the hard parts of all animals, have been produced by muscular pressures and contractions, and the frictions, strains, and impacts due to these. The demonstrations by Virchow and others that such is the origin of the platycnemic tibia is directly in the line of evolutionary science, and shows us that atavistic and reversionary characters are found in the muscular system as well as in the skeleton. Such characters are inheritable as well as those of the skeleton; but the characters of the skeleton can generally be shown to be inherited, because they appear before birth and are found at some stage or another of fetal life.

The variations in the characters of the human skeleton are of very various significance and value, and the zoölogist and pale-

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ontologist can perceive that they are sometimes misintrepreted by archeologists. Thus the presence of Wormian (Inca) bones and of a perforation of the olecranon fossa have no zoölogical value, while the prognathous jaws, tritubercular molar, and platycnemic tibia have such a value. The tufted hair of the negro has a human value only, as it does not occur in any of the quadrumana; but Dr. Brinton is not careful in his paper to point out these distinctions.

If the platycnemic tibia has been produced by muscular pressure in man it has been probably so produced in the apes, where it is a universal character. If the early fusion of the sagittal suture is produced by the vigorous contractions of the temporal muscle in the black races, due to prognathous jaws, this is probably why it is a universal character of the apes, where the jaws are still more prognathous. What may be the mechanical cause of prognathism is not explained by Dr. Brinton. That the prognathous jaws and platycnemic tibia are not found in the fetus by no means proves that they are not inherited characters. Besides the fact, already mentioned, that we are only thrown back on an inherited muscular structure, it is further to be marked that characters which indicate the evanescence or degeneracy of parts do not usually appear in the fetus, but are disclosed at later stages. Prognathous jaws are disappearing from the higher races, and the process of disappearance is in this point accomplished by a retention of the fetal face, which is excessively orthognathous. Prognathism is characteristic of most of the lower mammalia, and whenever man displays it, if he be, as evolutionists believe, descended from some other mammal, he is simply continuing to develop the old character in the old manner. The same reasoning applies to the platycnemic tibia and the tritubercular molar.

As regards the lemurine character of the tritubercular molar (which is formed before it is erupted from the alveolus), the term is a good one, as indicating the nearest of kin to man which present such molars; but this type can with equal propriety be called, as I have shown, the primitive placental molar. The lemur is the highest form next to man which displays it, but it was universal among placentals at one geologic epoch. It is possible that Topinard's suggestion as to the cause of its appearance in man is the correct one, as I made the same many years before; but that does not affect its value as an evidence of

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reversion, as in the cases already cited. There are various other ways in which molar teeth may degenerate besides reversion to tritubercuIy, with which dentists are familiar, and which may be explained as Topinard and I have done, *i. e.*, by change of food; but why the regular and normal mode should be tritubercuIy and not one of these other modes requires additional explanation. This explanation is that in a regular or normal retrogressive modification of structure is likely to return on the line by which it advanced; this is atavism or reversion.

That the Anthropoids have been directly derived by descent from the Lemuridæ rather than from the Old World monkeys (Cercopithecidæ) is probable for various reasons. I only mention now that this view is confirmed by the recent discovery by Forsyth Major, in Madagascar, in beds of Pleistocene age, of a skull of a new genus of Lemuridæ with tritubercular molars whose single species is nearly as large as a chimpanzee.

In closing these remarks I call attention to the frequent muscular and occasional cerebral anomalies found in the negro, which are of simian character and which indicate simian descent. An excellent synopsis of these has been given by Dr. Frank Baker in his address at Cleveland, as Vice-President of this Section, and by Prof. H. F. Osborn in lectures before the New York College of Physicians.

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ON THE MEANING OF THE NAME ANACOSTIA.

BY WILLIAM WALLACE TOOKER.

"Anacostia came from Nacotchtank and cannot be interpreted."* This brief paragraph, based upon the general discussion of the geographic nomenclature of the District of Columbia, before the Anthropological Society of Washington, on November 15, 1892, awakened my curiosity and quickened my desire to discover, if possible, the true meaning of the name in contrariety to the dictum of my text.

After extended investigation I show now some data relating to the etymology and meaning of the name *Anacostia*, which warrant careful consideration.

To the north of the valley of the Potomac, far up the river, which retains their name in a modified form, dwelt the *Sasquesahanoughs*, "booty people,"† who brought the *Tockwoghs*, articles obtained by looting the villages of their enemies; to the southeast, on the eastern shore of the bay, were located the *Kuskarawaokes*, "makers of white beads,"‡ while the *Patawomekes*, on the river, were "traveling traders" or "peddlers" of graphite or plumbago, "which they put in little baggs and sell it all ouer the country to paint theire bodyes, faces or idols."§ Further up the river lived the people, the name of whose village is now the subject of our consideration. Our purpose is to place them in the scheme of semi-civilization as existing at the time of Smith's discovery, and set forth in the interpretation of the names of their neighbors, for although they had periodical fits of quarreling, the greater portion of the time they were living in peace, devoted to agriculture, manufacture, and trade.

The locality was frequently visited by the English and other trading vessels in search of furs, and in the year 1632 Captain

* Buffalo Commercial, November 19, 1892.

† American Antiquarian, vol. 15, pp. 286–291.

‡ American Anthropologist, vol. 6, p. 409.

§ *Ibid.*, vol. 7, p. 174.

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Henry Fleet,* while on a trading voyage, sailed up the Potomac to the head of its navigation. He informs us in his "journal" of the event: "There is but little friendship between the Emperor [of the *Patawomeke*] and the *Nascostines* [*Anacostias*], he being fearful to punish them because they are protected by the *Massowmacks* or Cannyda Indians who have used them to convey all such English truck as cometh into the [Potomac] river to the *Massomacks*."

The traffic here indicated by Captain Fleet had been established for years, perhaps long antedating Smith's explorations, thus proving that the *Anacostias* were traders in English as well as in aboriginal manufactures and products, and that this broad stream was a general highway of trade by canoes. This fact I have shown in my former paper on "The Algonquian Terms Patawomeke and Massawomeke."† It must not be lost sight of, for here is found the clue that goes far to establish on a firm basis the deductions here introduced by the aid of the linguistic evidence quoted herewith.

Mr. James Mooney, of the Bureau of Ethnology, in his essay on "The Indian Tribes of the District of Columbia,"‡ says:

> *Nacochtank*, which was the residence of a chief and contained eighty warriors, was the principal settlement within or adjoining the District. The Jesuits, who came out later with Lord Baltimore, latinized the name as Anacostan, whence we get *Anacostia*, the modern name of the Eastern Branch, at Washington, and of the post office at Uniontown, on its southeast bank, and perhaps also *Analostan*, the name of the island opposite Georgetown.

This quotation furnishes us, with few exceptions, nearly all that Smith has to impart in regard to the town, its inhabitants, and also all the forms of the name now retained.

Smith's works (Arber's reprint) present the following few orthographical varients: *Nacotchtanke* (p. 52), *Nacothtank* (p. 113), *Nacotchtant* (p. 417), *Nacotchtanks* (p. 586), *Necosts* (p. 596), *Nacotchtanck* (map of Virginia). On a chart carried to England by Captain Francis Nelson, who sailed from Virginia in the "Phœnix,"§ on June 2, 1608, a copy having been sent Philip III

* Neill's Founders of Maryland, p. 25.

† American Anthropologist, vol. 7, p. 174.

‡ *Ibid.*, vol. 2, p. 259.

§ Arber's Smith, pp. 40, 109.

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of Spain by Velasco, in his letter of March 22, 1611, was lately discovered among the general archives of Simancas (vol. 2588, fol. 22); we find the village there displayed as *Acoughtank*. It is said this chart illustrated Captain John Smith's "True Relation," and was sent to England with it.* If this be true, the geographical location of the village as indicated and its name must have been known previous to Captain Smith's voyage of exploration of the following month to the head of Chesapeake bay and the Potomac river. In fact, he must have had a copy of the chart with him, as the foregoing indicates. It will be noticed that while the spelling noted thereon differs but little in its pronunciation from the others, it adds considerable etymological evidence to my analysis of the name, and is also a valuable accession to our knowledge of the locality.

The actual difference between the earliest form, *Acoughtank*, Smith's *Nacotchtank*, Fleet's *Nascostine*, or the Jesuits' *Anacostan* is very slight indeed; in fact, the distinction is more apparent than real.

Allowing for the habit the English had of getting rid of harsh or unwonted sounds and the dialectic variation characteristic of Algonquian phonology, in that *c*, according to Eliot's Indian Grammar, had the five sounds of *ca*, *ce*, *ci*, *co*, *cu*, the last two being undoubtedly gutturals, represented by Smith and some others with the sound *co*; by Eliot and Williams with *qu;* also that *ch* was softened into *sh* by many of the English, and that *t* of the second syllable of Smith's notations should be eliminated as an interpolation, we immediately observe that *anacoch*, or *Anacos*, is identical in its phonetic value and radically cognate with the Massachusetts *Anaqush*, "to trade," "to barter," which Eliot uses with the suffix of the animate plural in *Anaqush-aŭog*, "traders." With the demonstrative prefix of the second person and the generic for man in juxtaposition with the terminal *oh* affixed thereto, marking the governing noun, he gives in the same verse *kut-anaqush-aenumoh*, "thy merchants of" [literally, thy trading-men of]; with the prefix of the third person and plural termination of the inanimate object,† *wut-anaqush-aongash*, "his or her merchandise" [literally, his

* Brown's Genesis of the U. S., vol. I, p. 184.

† Isaiah 45, 14.

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trading things]. The theme can be further multiplied, with varying terminals dependent upon the grammatical construction of the cluster word, from both Eliot and Williams. The latter evidently understood the term to mean secondarily "to buy and sell." The archaic meaning, gained by comparative study of its radicals, seems to have been "to return a gift," or "to exchange gifts." The dialectic changes before mentioned are plainly visible in the word for "my father," from the following dialects of the same stock: Delaware, *Nooch;* Mohegan, *Nogh;* Massachusetts, *Noosh;* Narragansett, *Nôsh.* It can be observed in many other examples; for instance, *Uppauquauk*, "a covering place," applied to marshy pools of water where the cat-tail flag (*Typha latifolia*) was gathered for covering wigwams and making mats, is a name of common occurrence throughout New England. It is found varied on Long Island, New York, in records and documents as *Apocuck* and *Apocock*, and is now colloquially *Paucuck* in the town of Southampton. Thus it is easy to be seen how these names, once obtained and recorded, no matter how far out of the way they might be from the aboriginal utterance, which also varied in different individuals of the same tribe, were soon adopted and perpetuated by alien speech. Even the Jesuits, although they were scholars and linguists, found considerable difficulty in acquiring the sounds and learning the language.

The terminal of the name, *-tan* or *-tanck*, presents itself in more than one instance on Smith's map of Virginia, and, being invariably affixed to names of towns or villages, must have the same meaning in every case. The terminations are varied from *-oughtan*, of *Kec-oughtan*, "the principal town;" *-tanck*, of *Paranka-tanck*, "at the town on one side," or "on the other side" (this adjectival prefix is also used in the Powhatan for the numeral 5, meaning "all the fingers on one side"); *-to-atan*, of the well-known name of *Powh-atan*, "the falls-town." I differ with some authorities on the latter name, but that these are not random guesses I hope to show at some future time. Hence I would consider *-tan* or *-tanck* an abbreviated form of the Narragansett *otan*, "a town," with the locative affix in same language *otan-ick*; Massachusetts, *otan-it*, "to or at the town." Thus by analysis we have in these two dialects the resulting synthesis of *Anaqush-otan-ick*, or *it* (= *Anacos-tan-ck* or *Anacoch-*

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tan-t), "at the trading town:" in the anglicized plural form, "those of the trading town." The Jesuits no doubt dropped the locative affix in their form of *Anacostan* (= *Anaqush-otan*).

At the time of Captain Fleet's parley with the interpreter of the *Massawomekes* at this town, on the 13th of June, 1632, the *Nascostines* became very jealous and did not wish Captain Fleet to visit the villages of the former tribe. He says: "They did seek to withstand me from having trade with the other Indians, and the *Nascostines* were earnest in the matter, because they knew that our trade might hinder their benefit."*

* Neill's Founders of Maryland, p. 26.

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THE KINSHIP OF THE TUSAYAN VILLAGERS.

BY J. WALTER FEWKES.

I have already discussed the consanguinity of one of the pueblos on the East mesa of Tusayan, the Tanoan community called Háno. There are two other villages, Walpi and Sitcomovi, on this mesa, the people of which speak the Hopi language and do not understand the Tanoan. Sitcomovi, the smaller and the later founded of these, is likewise more composite in its blood kinship.

A recount* of the population led me to distrust the figures given in the last census report (1891) and to publish the accompanying enumeration, which is thought to be more reliable.

The object of the present article is to analyze this census as a contribution to the discussion of the affinities of the Hopi, for it is believed that until this is done we are groping in the dark in trying to answer the question of Tusayan kinship.

It is doubtful whether Walpi at the time (1540) "Tuzan" was visited by Tobar occupied its present site. Indeed, two places on the lower terrace of the mesa are still pointed out as sites of the village, even after the advent of the first Spanish expeditions. It is quite impossible to determine the exact date when a settlement was first made on the present site of Walpi, although some of the old men declare that it was subsequent to the great rebellion of 1680. A mission, called San Bernardino, was built in early times at Awatobi; another (San Bartolome de Jongopavi) at Cuñopavi, and a third† (San Francisco de Oraibi y Gualpi)

*The census used in this article was made for me by the late A. M. Stephen in his work for the Hemenway Expedition. The discussion in this article is confined to the inhabitants of the East mesa.

†I have never had the site of the mission at Oraibi pointed out, but there is a legend of the existence of one on the "Moen Kopi wash." The Navajos report the existence of ruins of missions at Cañon Tseyi (Chelly) and Cañon Chaco, but these have not been verified.

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at either Oraibi or Walpi.* The situations of the first two are known to me, but that of the last is more problematical.

About the only remnants of the Tusayan missions, except that of Awatobi, now visible are beams from the same in kivas and in private houses, and fragments of the old bells, of which last the Keam collection has three specimens. The upright walls of portions of the Awatobi mission still stand, affording a good idea of its former size and general character; but of the others even the position is doubtful and their ground plan very obscure. The possible site of the Walpi mission, Kisakovi, is on the southwest point of the mesa on the lower terrace. The place is called Nücaki, but attempts to determine the derivation of either Nücaki or Kisakovi have not been satisfactory. An intelligent Hopi, Totci, who speaks a little Spanish, said that Nücaki is equivalent to "Misa Casa" or mass-house, an exact aboriginal conception of a mission.

The time of the Spaniards (*Wa-pa-nob-na(s)* or "long-gowned men" is held in universal detestation by the Hopi, and many, probably somewhat distorted, stories are told of their priests and the onerous duties they imposed upon the Indians. It is extremely difficult to arrive at any clear or accurate knowledge of this epoch from traditional sources, and it seems incredible that the few Spaniards who lived in Tusayan could have forced the Hopi to carry the beams for their missions from the far-distant mountains or to erect the great buildings. Probably the stories of their immorality have some basis of truth, but have been more or less exaggerated, and today none of the old men have a good word to say of the people who brought to them the horse, sheep, peaches, melons, and many other valuable gifts.

The great antiquity which has been ascribed to the present pueblo, Walpi, is not supported by a close examination of evidences. The houses now standing are certainly not over two

*As this paper is going to press my attention is called by Mr. F. W. Hodge, of the Bureau of Ethnology, to a reference by Agustin de Vetancurt, in his *Cronica de la Provincia del Santo Evangelio de México*, p. 321, to the mission of "San Francisco de Oraybe" with "una aldea llamada Gualpimas." It would thus appear that Oraibi was the mission seat and Walpi its *visita* at the time of the Pueblo revolt of 1680, soon after which Vetancurt's work was written.

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hundred years old, and there was no pueblo there in 1540, when Tusayan was first visited, although Awatobi was in its prime at that time. In that year Walpi was a hamlet in the foot hills possibly with the same name, but inconspicuous both in size and population. Even when the Spanish missions were built the settlement was so small that it was a parish of Oraibi and not as important as Cuñopavi. I have not seen any evidence to support the statement that in the great rebellion the Spanish priests were thrown from the top of the mesa; but if this were done, I doubt whether it took place on the East mesa, since the chapel or mission to which the fathers would naturally retreat was in the plain, and the pueblo at that time was not on the mesa summit. There may have been some houses or watch-towers on the present site of Walpi at that time and before the first arrival of the Spaniards, but the majority of the people did not leave the old site until about the close of the seventeenth century.*

We must remember, in discussing the consanguinity of the people of Walpi and its colony, Sitcomovi, that additions to it came from several towns which are now in ruins, and that until we know something of the origin of the people of these pueblos we are dealing with doubtful data. Awatobi no doubt contributed many colonists. Sikyatki, which was destroyed by the warriors of Walpi, furnished its contribution, especially women. The people of Payüpki no doubt left some of their number when they moved back to the Rio Grande region. All of these elements must be considered when we follow the legendary history, and all point to the composite nature of the survivors.

The approximate date of the founding of Walpi on its present site is probably not far from the year 1700. While the people lived on the first terrace the settlement was small, as indicated by the size of the ground plan of the ruin and the surrounding mounds. The first houses were probably erected at Sitcomovi and Hâno in the next two decades, 1700–1720. There is no available means of ascertaining how long the ancestors of the Walpians lived on the site of the former town.

*The name "Gualpi," however, appears in the Spanish accounts as early as 1600, which, if my theory of the age of the present town is correct, would prove that it was applied to the pueblo on its old site.

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Victor Mindeleff, in his valuable report on "Pueblo Architecture," describes several Tusayan ruins to which we may look for the former homes of some of the ancestors of the present inhabited pueblos. There are several others not mentioned by him which undoubtedly furnished their quota. Many of these ruins are of considerable size and bear evidence of antiquity or long occupancy; others were but temporary halting places. Each was a feudal community, acting for its own interest and often at war with its neighbors. This internal strife and the inroads of hostile nomads led to continual abandonment of old and the construction of new villages, and in many instances to amalgamation of semi-sedentary peoples.

The Hopi have traditions that the inhabitants of some of their ancient pueblos, now in ruins, have migrated in a body to the Rio Grande country, and these legends are historically probable, as in the case of the so-called Moquiños.

Fifty years ago some very old women still lived who remembered the abandonment of Payüpki, now a ruin close to the trail from Walpi to Oraibi, on the Middle mesa. The immigrants left the country, it was said, when the women were little girls and went to the Great River. The Rio Grande pueblo, Sandia, is now called by the Hopi Payüpki because settled by them. It is not improbable that these people were the thirty families brought out of Tusayan a century ago by Franciscan fathers, as recorded in historical documents. I find no tradition that any considerable number of people from Awatobi escaped the destruction of their pueblo and settled in the east, and consequently cannot follow Bourke in his identification of the Moquiños with the refugees from Awatobi.

The story of the destruction of Sikyatki (Yellow House) is a fair example of the disastrous feuds and continual tragedies which have dotted our southwest with ruined pueblos.

The site of this pueblo can readily be made out in the foothills below the gap (Walla), to the right of the trail from Keam's Cañon. It must have been a town of considerable size and age; but continual altercations and disputes with the Walpians about fields and springs led to an attack when the warriors were away. The place was destroyed and the women captured, while many of the inhabitants found refuge in Awatobi, where they trans-

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mitted their grievances, which had their influence no doubt in increasing the animosity between this pueblo and Walpi. Except the fact that Sikyatki fell before the destruction of Awatobi (1700), we know little or nothing of the date of this prehistoric tragedy.

The following tables give an analysis of the census of the two pueblos, Walpi and Sitcomovi, which, in connection with that of Hano, already previously published, give a good idea of the gentile and family kinship of the men, women, and children now living on East mesa:

Summary of Walpi Gentes.

Families.*	Men.	Women.	Boys.	Girls.	Totals.
A′-la	24	22	11	11	68
Pat′-ki	18	24	13	2	57
Tcü-a	14	10	8	3	35
Pa′-kab	8	8	4	4	24
Ko′-kop	10	7	1	3	21
Ta′bo	10	5	1	3	19
Tü′-wa	6	4	1		11
Ho′-nau-ûh	2	2	1		5
Ka-tci′-na	4	2	2	2	10
A′-sa	13	2	1		16
Pi′-ba	1				1
Ho-na′-ni	1				1
Residents in Walpi born elsewhere.					
Sitcomovi	10				10
Hano	8				8
Cipaulovi	1				1
Zuñi	2				2
Jemez	1				1
	133	86	43	28	290†

*Strictly speaking, phratries or collections of gentes or peoples, *nyú-mû(s)*.

† The total population of Walpi in 1891, according to the Census Bulletin, was 232, or 117 males, 115 females. Of these we are told 193 speak Indian, and one is able to write the same. In the seven villages six Hopi were found who could "write Indian;" but not one could "read Indian" after he had written it. Certainly the literary accomplishments of these six could not have been very extensive.

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Adults Born in Walpi—Non-residents.

Residence.	Men.	Women.	Total.
Sitcomovi	13	5	18
Hano	12		12
Micoñinovi	1		1
Oraibi	1		1
Zuñi	4		4
Jemez		1	1
Acoma		1	1
Elsewhere	2	2	4
	33	9	42

Total population of Walpi 290
Non-residents 42

Actual enumeration December 1, 1893.. 248

Summary of Sitcomovi Gentes.

Families.	Men.	Women.	Boys.	Girls.	Totals.
Ho-na′-ni	18	6	3	5	32
A′-sa	12	11	5	7	35
Pat′-ki	2	4	1	3	10
Tü′-wa	3	2	3	5	13
Ta′-bo	4	1	3	4	12
Ko′-kop	1	2	3	1	7
Pi′-ba		4	1	3	8
Ka-tci′-na	2				2

Residents in Sitcomovi Born Elsewhere.

Paiute mother; Walpi father	2		1		3
Oraibi		1		1	2
Cuñopavi	1				1
Walpi	13	5*			18
Hano	6				6
Navajo mother; Walpi father		1			1
	64	37	20	29	150

* A considerable number, when we remember how seldom the daughter leaves the maternal home. There are good reasons for this, and, strictly speaking, in this instance there is no significant violation of the matriarchal right involved.

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Adults Born in Sitcomovi—Non-residents.

Residence.	Men.	Women.
Walpi	10	
Micoñinovi	1	
Awatobi	1	
Zuñi	1	
Hano	1	
Elsewhere	1	
	15	

Total population of Sitcomovi	150
Non-residents	15
Actual enumeration December 1, 1893.	*133

In the preceding tables the several families who live in houses lately constructed in the plain are referred to the village from which they came. Most of these live on the mesa in winter, but the number which permanently occupy their homes near the fields will increase with the progress of time.

Each of the above-mentioned nyû-mû(s), or peoples, contains several gentes, a knowledge of which has an important bearing on Tusayan kinships. As the determination of these groups is difficult, the classification is often obscure. In his "Study of Pueblo Architecture," Mindeleff, on Stephen's authority, has given a somewhat different roster of the gentile and larger groups of the Hopi, but on later studies the last-mentioned author was led to change some of his opinions in regard to classification and to add certain gentes to the different families. From these later conclusions and corrections resulting from my observations I present the following enumeration of gentes as a nearer approximation to a correct classification, but the arrangement† is still in a measure provisional, although in the main reliable as a general presentation of the subject:

* The Census Bulletin (1891) reported 103 persons.

† The larger groups, nyû-mû, are mentioned in turn with the list of gentes, wün-wü(s), in each.

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A'-la-nyû-mu, Horn People.

Al'-	wüñ-wü,	Horn.
Pañ'-wa	"	Mountain sheep.
So-wi'-in-wa	"	Deer.
Tcüb'-i-yo	"	Antelope.
Tcai'-zri-sa	"	Elk.
Le'-hü	"	Seed grass.
A'-nü	"	Red ant.
To-ko'-a-nü	"	Black ant.
Wu-ko'-a-nü	"	Great ant.
Ci'-wa-nü	"	Ant.
Le-li-o-tü	"	Tiny ant (*sp. incog.*).
Ca-kwa'-len-ya	"	Blue Flute.
Ma-si'-len-ya	"	Drab or all colors Flute (extinct at Walpi).

Some authorities say the Flute and A'-la were originally distinct groups. Others enumerate a house gens, *Kik-wüñ-wü*, among the Horn people.

The Flute people came to Walpi after the Snake, and the episode of their historical advent is dramatized in the Flute ceremony. At the biennial celebration of the Le'-len-ti or Flute observance the chiefs of the Bear and Snake societies formally receive the Flute. As representatives of the latter approach Walpi a line of meal is drawn on the ground to close * the trail and the Snake and Bear chiefs, accompanied by two girls, stand behind it. Each girl carries a flat basket tray, on which is a *ti'-po-ni* or chieftain's badge, covered with a blanket. They represent the two Snake virgins, and are accompanied by a boy, representing the Snake youth. As the Flute chief advances to the meal on the ground, the *ti'-po-ni*(*s*) are uncovered and the Flute chief presents the girls and boy with the amulets and the small wooden cylinder used by them in the ceremonies of the last day, as described in my account of the Cipaulovi Flute. These objects are similar to those on the heads of the lightning symbols in the Snake ceremonials, as described in my account

* This method of closing the trail by a line of sacred meal is mentioned in early Spanish writings.

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of the Snake dance. After this formal reception, the Flute chiefs are escorted to the kiva.

Pat-ki-nyû-mû, Water-house People.

Pat'-ki-	wüñ-wû,	Water-house.
Ka'-ü	"	Corn.
O'-mow-ûh	"	Rain cloud.
Ta-ña-ka	"	Rainbow.
Ta'-la-wi-pi-ki	"	Lightning.
Kwan	"	Agave.
Si-vwa-pi	"	Bigelovia graveolens.
Pa'-wi-kya	"	Aquatic animal (duck).
Pa'-kwa	"	Frog.
Pa-va-ti-ya	"	Small aquatic creatures except fishes; tadpole.

This people came from the red land of the South, called Pa-lat'-kwa-bi. Where this land was is enigmatical, but it was somewhere in the great-cactus region. Anawita, the leader of this people, is chief of the Warrior Society, Kwa'-kwăn-ti, which brought the cult of the Plumed Snake to Tusayan.

*Tcû'-a nyû-mu, Snake People.**

Tcü'-a-	wuñ-wü,	Snake.
To'-ho-üh	"	Puma.
Hü'-wi	"	Dove.
Ü'-cü	"	Columnar cactus.
Pü-na'	"	Fruit of cactus.
Yü'-ñü	"	Opuntia.
Na'-bowü	"	" frutescens.

Extinct.

Tü-bic	wuñ-wü,	Sorrow.
Pa'-tuñ	"	Squash.

* Much obscurity pertains to the relationship of the Snake phratry and the Snake priesthood, and it is interesting to find Wiki, the Antelope chief, enrolled as a member of this people and not among the Horn people. On the other hand, we find the Flute people closely associated with the Horn (A'-la) people, to whom belong the Deer and other horned gentes. As

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A′-to-ko	wuñ-wü,	Crane.
Ke′-le	"	Pigeonhawk.
Tci-nuña	"	Thistle.

Pa′-kab nyû-mû, Reed People.

Pa′-kab	wüñ-wû,	Phragmites communis.
Kwa′-hü	"	Eagle.
Kwa′-yo	"	Hawk.
Ko-yo′-ño	"	Turkey.
Ta-wa	"	Sun.
Pa-lüñ-am	"	Paluña-ho-ya is the twin brother of Pü-ü-kon-ho-ya.
Co-hü	"	Several (?).

Some authorities include Owl and Mocking-bird.

Ko′-kop nyû-mû, Woods People.

Ko-kop-	wüñ-wû,	Woods.
I′-sau-üh	"	Coyote.
Kwe′-wû-üh	"	Wolf.
Si-kya′-tai-yo	"	Yellow fox.
Le-tai-yo	"	Gray fox.

has been shown, the Snake ceremonial, called the Snake dance, is controlled not by the chief of the Snake priests, but by Wiki, an Antelope, who is a member of the Cactus gens of the Snake phratry. The totems of two of the gentes of the Horn people are Antelopes. We have, then, this strange connection—the chief of the Antelope priesthood controlling the Snake ceremonials, while the Deer and Antelope gentes belong to the Horn phratry to which the Flute priesthood is allied. I can only interpret it as one more likeness between these two sacerdotal organizations, the Snake and the Flute fraternities. It looks as if those who say that the Flute people were formerly distinct from the Horn people were right, but we must remember, as I shall show from a roster of the Snake Society, that the religious fraternities are not confined to the members of a family of the same name. This perplexing condition of the presence of Horn gentes in Snake ceremonials and of Snake gentes in an Antelope fraternity is interpreted as another likeness between the Snake and Flute celebrations in addition to those mentioned elsewhere.

To complicate the subject, the Snake priests scout the idea that they are related in any way to the Flutes as a society. Their rituals, however, seem to me to prove that they are in some way connected.

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Zro-ho-na wüñ-wû, Small mammal (*sp. incog.*).
Ma-si′ " Ma-sau-ûh.
E-o′-to-to " A supernatural being.
Tü-vo′-ü " Piñon.
Ho′-ko " Juniper.
A-wat′ " Bow.
Si-kyatci " Small yellow (?) bird.
Tü-vü-tci " Small red bird.

Tab nyû-mû, Cottontail Rabbit People.

Tab wüñ-wû, Cottontail rabbit.
So′-wi " Hare.

Tü-wa′ nyû-mû, Sand People.

Tü-wa wüñ-wü, Sand or earth.
Kü′-kutc " Lizard, reptile.
Si′-hü " Flower.
Na′-na-wü " Small striped squirrel.

Ho′-nau-üh, Bear People.

Hon′- wüñ-wü, Bear.
To-ko-tci " Wild cat.
Tco′-ro " Bird (blue).
Ko′-kyuñ-üh " Spider.

Ka-tci′-na nyû-mû, Ka-tci-na People.

Ka-tci′na wüñ-wü, Ka-tci′-na.
Gy-a′-zro " Gy-az′-ro.
Añ-wu′-si " Raven.
Si-kya-tci " Yellow bird.
Ta-wa-ma-na " Black bird, yellow ?
Sa-lab′ " Spruce.
Sü-hüb " Cottonwood, broad leaf.

*Tca′-kwai-na nyû-mû.**

Tca′kwai-na wüñ-wü.
As- " Asa.

* Likewise called A′-sa nyû-mû.

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Kwiñ-yap	wüñ-wû,	Oak.
Hoc'-bo-a	"	Chapparal cock.
Po'-si-wû	"	Magpie.
Tci'-sro	"	Snow bunting.

Pi-ba nyû-mû, Tobacco People.

Pib-wüñ-wü,		Tobacco.
Tcoñ	"	Pipe (*tco-no*).

Ho-na-ni-nyû-mû, Badger People.

Ho-na'-ni	wüñ-wü,	Badger.
Mü-i-nyan	"	Porcupine.
Wi-co-ko	"	Turkey buzzard.
Bu'-li	"	Butterfly.
Ka-tci'-na	"	Ka-tci'-na.

In looking over the classification of gentes given above, it is difficult to make out any definite law of association. It can readily be understood why gentes named from horned mammals should be placed in the Horn people and why the two kinds of rabbits should form the Tab-nyû-mû. The foxes, coyotes, and wolves naturally go together, and in the association of the eagle, hawk, turkey, and sun we meet a widespread aboriginal conception. Why the ants should be associated with the Horn people or the Agave with the Water House is not as clear. Not until we are able to trace back the origin of the names, a probability which now seems impossible to realize, can we hope to discover the meaning of the singular grouping of Hopi gentes.

For names of gentes animals have the preference, there being forty-six of these out of eighty-five totems. Plant names designate twenty-one, and all other objects eighteen. There are, however, only four peoples named from animals, three from plants, and six from all other objects.

There is so much obscurity in the information derived from legends in regard to the direction whence these family groups came to Tusayan that this testimony should not be given too much weight. The following data were obtained on this point:

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Families.	Direction.
1. A′-la, Horn.... Len′-ya, Flute	Kwactapabi, or due north.
2. Pat′-ki, Water House....	These three from the south.
3. Tü′-wa, Earth Kü-kü-ti, Lizard.....	
4. Ta-bo, Cotton-tail rabbit. So-wi, Hare	
5. Tcü′-a, Snake.....	Junction of the San Juan and Colorado rivers.
6. Pa-kab′, Reed	Near Micoñinovi.
7. Ko-kop, Woods..... ... I′ sau-ûh, Coyote.....	Rio Grande.*
8. Ho′-naü-ûh, Bear,.....	(?) †
9. Ka-tci′-na, Ka-tci′na.... Gy-á-zro, Paroquet.....	Originally from the Rio Grande country, but according to tradition lived for some time near Sikyatki.
10. A′-sa, Tansy Mustard ...	Abiquiu.
11. Pi′-ba, Tobacco.....	Awatobi.‡
12. Ho-na′-ni, Badger.....	Kicyuba, ⸗ a spring sacred to Ka-tci′-na(s).

The legends of the sequence of the advent of the above peoples in Tusayan are also obscure, but the following has been given as probable:

1. Ho′-nau-ûh.
2. Tcü′-a.
3. A′-la.
(?) 4. Pat′-ki. Tü′-wa. Ta′-bo.
5. Pa′-kab. Ko-kop.
6. Ho-na′-ni. Ka-tci′-na.
7. Pi′-ba, 1700 A. D.
8. A′-sa, 1700–1710 A. D.

*After reaching Tusayan they built Sikyatki, which they occupied until its destruction.

† Many conflicting stories are told about the original home of this people. They are said to have been the first people to arrive in Tusayan and were associated with the Snake people in the reception of the Flute. The Bear is still personified in the Snake ceremonials, but although reputed to be the oldest people in Walpi they are at present almost extinct in that pueblo, and are not represented in Sitcomovi.

‡ This people was strong in Awatobi. The ancestor of the oldest Snake woman in Walpi claims descent from Awatobi, but the Snake people are not mentioned from this pueblo.

⸗ The Badger people and the Ka-tci′-na(s) are almost intimately associated. The Badger people first came to Walpi when the village was on the old site, and some of them went on to Awatobi, from which they returned after the fall of that pueblo.

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We can safely follow the legends that the first three families came in the order mentioned. The dates of the arrivals of the last two are probably accurately given, but there is much doubt about the others. The Ho-na′-ni(s) and the Ka-tci′-na(s) were late arrivals, probably not long before 1700. I doubt whether the Hopi had any true Ka-tci′na* dances in the early times, and ascribe them to the Ho-na′-ni, who brought this cult from the eastern or Rio Grande pueblos. In the earliest times this cult was probably unknown, as the legends distinctly state that the Ho-na′-ni brought it to Walpi when they came.

This is such an important conclusion that legendary evidence supporting it may very properly be presented in this place.

A variant of the origin of the Ho-na′-ni people is as follows:

Certain Ka-tci′-na(s) came from Kicuba to Oraibi. In a field near that village they gave exhibitions† during the day and stood in four lines inclosing a hollow square. At the termination of their songs, Ho-na′-ni came up from the At-kya-a (below) through a si′-pa-pû in the center of the square. On his back he carried a bundle containing all the charms (ña′-hu) known to the Hopi, and in his left hand a wing feather of the buzzard. He said: "I have come, knowing all charms; I bear the feather with which to perform na-vo′-tci-wa (purification) and drive away all bodily ills;‡ all people have this feather now I have brought it."

The Ka-tci′-na(s) then all responded, "An′-tcai;§ now we shall change into the Ho-na′-ni-nyû-mû, and you shall be chief."

The chief and a great many of the Ka-tci′-na-nyû-mû stopped at Oraibi, but others went on to Cûñopavi and Miconiñovi and exhibited, but did not remain. They then went to the early Walpi (on the terrace), where many remained, but a considerable number went on to Awatobi. When that pueblo was destroyed some of the survivors of the Ho-na′-ni were taken to Micoñinovi. Thus it happens that there are Badger people at Oraibi, Micoñinovi, and at the East mesa, and hence likewise the intimate association of the Ho-na′-ni and Ka-tci′-na(s). Many other stories

*I regard the name Ka-tci′-na, applied to this cult, as foreign to the Hopi tongue, and derived from eastern peoples.

†Danced and sang as Ka-tci-na(s) are wont to in their celebrations.

‡This chief was the first Poc′-wymp-ki-ya or true shamans, an organization now extinct in Walpi.

§A response equivalent to "Amen."

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might be given in which the Badger people are associated with the Ka-tci'-na(s), and all point in the same direction, viz., that this cult was brought to the East mesa by the Badgers before the fall of Awatobi.

The supposition that the Ho-na'-ni brought the Ka-tci'-na cult, which was a novel one, may account for their separation from the Walpians and the consequent founding of Sitcomovi. As they claim to have come from the Rio Grande, where this cult was strong, it was perfectly natural for the A'-sa people to assimulate with them as they did at Sitcomovi.

The A'-sa people* are admitted by all to be composite or to have Tanoan, Navajo, and Hopi blood. They number thirty-five in Sitcomovi, or about one-fourth of the complete enumeration. At Walpi, however, their strength is not so great; but even there we find sixteen out of the whole population, or about one-sixteenth. If faith can be put in legendary history, we can legitimately conclude that between a fifth and a sixth of the inhabitants of these two pueblos are composite, or of Tanoan, Athapascan, and Hopi blood. With the exception of the admixture through the A'-sa family, there is little evidence that there is a large amount of Navajo blood in the remaining phratries.

The other families who claim the Rio Grande region as the home of their ancestors are the Ko'-kop, Ho'-nau-ûh, and Ka-tci'-na, with a total of thirty-six persons, about the number of the A'-sa people.

The Ho'-nau-ûh or Bear people claim to be the oldest people of Walpi. Their advent is said to have been even previous to that of the Snake (Tcü'-a). There is this evidence that they were at the East Mesa before the Flutes. In the historical dramatization† which biennially celebrates the coming of the Flute people, Winuta, who personifies the Bear chief, and Hoñ'-yi, who is to be the chief of the Snake Antelopes at the death of Wiki, are the two official personages who formally receive the Flute chief, and Winuta is spokesman.

A petition to the general Government was circulated among the Tusayan villages last year and the totem signatures of the

*The A'-sa people are sometimes called the Tca-kwai'-na people. Tca-kwai'-na is one of the Ka-tci'-na(s).

†I shall in a subsequent article describe in detail this most interesting historical dramatization and its important bearings on the sequence of the arrival of the Bear, Snake, and Flute peoples at Walpi.

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heads of the important families were obtained. These signatures were made by the leading male members of the families, and have an ethnological interest as confirmatory of the division of the people into clans and families. As, however, our present discussion pertains to the East mesa, I have given only the names and corresponding totems of those who live at this place. By social standing is meant the rank of the man in the sacerdotal society to which he belongs.

Family.	Name.	Totem.	Social standing.
A′-la	Ha-yi	Antelope.	
	Si-kya-ven-tima.	Hoofs of mountain sheep.	
	Ha-ha-we	Antelope.	
Pat′-ki	Anawita	Rain cloud and corn stalk.	Warrior chief.
	Supela	"	
	Kwatcakwa	Rain cloud	Sun priest (chief).
	Sikaustewa	"	
	Kwaa	"	
Tcü′-a	Hoñi-yi	Snake	Represents Snake chief in the Flute.
	Samiwiki	Columnar cactus.	Antelope chief.
	Kopeli	Snake	Snake chief.
	Uüyawa (S)	Snake and bird.	
Pa-kab′	Winuta	Phragmites communis.	Personifies Bear in Flute ceremony.
	Tuwasmi	"	
	Pawatiwa	"	"Priesthood of Bow" (chief).
	Kanü	Pū-ü-koñi-ho-ya.	
Ko′-kop	Nasyuñiweve	Ma-sau-wûh.	
Ta′-bo		Rabbit.*	

* No signature of a member of these families was obtained on the East mesa, but the totems mentioned were obtained from Oraibi and the Middle mesa.

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Family.	Name.	Totem.	Social standing.
Tü′-wa.....	Kakapti.....	Lizard *.....	Antelope courier.
Ho-nau-ûh		Bear's paw.†	
Ka-tci′-na	Intiwa.....	He-he-a	Ka-tci′-na chief.
A′-sa.....	Symotiwa. Süyüku Nâhu. Nuvati (S)	Tca-kwai-na. ♂ " Rabbit stick.	
Pi′-ba.....	Hani.....	Tobacco flower.	
Ho′-na-ni.	Yoyowaya (S)... Tunuma (S)..... Masiumtiwa.....	Mythic badger. Badger claws. "	

The social division of the villagers into families must be kept distinct in mind from that of the sacerdotal fraternities. These latter include many members of all the former. To show what is meant I have analyzed the Antelope and Snake fraternities in the following lists:

Walpi and Sitcomovi.

Kopeli (chief) Teü-a (Snake)		9
Sïkyahoñawa.....	"	
Nuva′oyi.....	"	
Momi.....	"	
Nüvawünü.....	"	
Ca′na.....	"	
Ho′nauüh (Lesma).....	"	
Marantaka.....	"	
Küt′cve.....	"	
Su′pela Pat′-ki (Water house)		7
Kwatcakwa.....	"	

* The totem of several men of the Earth family is a circle, representing the horizon.

† No signature of a member of these families was obtained on the East mesa, but the totems mentioned were obtained from Oraibi and the Middle mesa.

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Makiwa	Pat′-ki (Water house)	7
Poc′to	"	
Sitaima	"	
Sikyauistiwa	"	
Nasimoki	"	
Talahoya	A′sa (Tansy mustard)	7
Lomanankwücü	"	
Sikyatala	"	
Nüvati	"	
Maï	"	
Gyacusrü	"	
Püryato	"	
Siyükŭli	Ho-na′-ni (Badger)	3
Yoyowaiya	"	
Ami	"	
Hani	Pi′-ba (Tobacco)	2
Sikyatûñanma	"	
Kanü	Pa′-kab (Reed)	2
Piba	"	
Siskyauma	Ta′-bo (Rabbit)	2
Hoñabi	"	
Lomayamtiwa	Ka-tci′-na	1
Tühkwi	A′-la (Horn)	1
Tcono	Len′-ya (Flute)	1
Nakavü	Ko-kop (Wood)	1
Sikyabotima,	Tü-wa (Earth)	1
Total in Walpi and Sitcomovi		37

Hano.

Pa′tuñtühpi	Ku′-lon (Corn)	2
Ka′no	"	
Wi′wila	O′-ku-wa (Cloud)	1
Tc′oyo	Ka-tci′-na	1
Total in Hano		4

The above list, to which must be added two active members of the Snake fraternity from the Middle mesa, makes forty-three, the present membership from the following families:

A-la	2	Tü′-wa	1
Pat′-ki	7	Ka-tci′-na	1
Tcü′-a	9	A′-sa	7
Pa-kab	2	Pi′-ba	2
Ko′-kop	1	Ho-na′-ni	3
Ta′-bo	2		

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It appears from the above that the strongest family in this organization is the Snake, with nine members, but the Pat'-ki and A'-sa are easy seconds, each with seven members. The Bear is not represented. By consulting the census we learn that there are but two members of this ancient family in both Walpi and Sitcomovi, and it is therefore not strange that it is the only one not represented in the Snake priesthood. The leading family, Tcü'-a, is confined to Walpi; the Pat'-ki, another powerful component, is strong in Walpi and weak in Sitcomovi. These facts all tell in favor of the supposition that the Snake dance was celebrated in Walpi before the settlement of Sitcomovi, as the legends distinctly state.

Tcüb'-wymp-ki-ya (Antelope Priests).

Samiwiki	Tcū-a (Snake)	4
Wikyatiwa	"	
Hoñ'yi	"	
Ka'sro	"	
Kwaa	Pat-ki (Water house)	2
Tcoshoñiwa	"	
Nasyüñweve	Ko-kop (Timber)	2
Kätci	"	
Hahawe	A-la (Horn)	2
Samimoki	"	
Ka'kapti	Tū-wa (Earth)	1
Intiwa	Ka-tci'-na	1
Masiumtiwa	Ho-na'-ni (Badger)	1
Weywey, Ta'-wa } Tanoan	Ten-yo (Pine) " "	2
Total		15

The chiefs of this fraternity are:

Samiwiki	Tcü-a		Moñwi	(Chief).
Nasyünweve	Ko-kop	Kü'-yi	"	(Water Chief).
Hahawe*	Horn	"	"	"
Kwaa	Pat-ki	"	"	"
Tcoshoñiwa	"	"	"	"
Kakapti	Tü-wa	Tü-wa	"	(Earth Chief).

The strongest representation in the Antelope fraternity, as in the Snake, is from the Snake family, and the Water House and

* This old man performs his part for his nephew, a small boy not old enough for the duty. He functions also as the smoker chief.

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Horn contribute two each. These three ancient families are well represented, as they naturally would be, among the chiefs.

If we glance over the lists of Walpi and Sitcomovi gentes several items appear highly suggestive in connection with the fact that the latter pueblo was never mentioned * in early Spanish history. The strongest families at Walpi are not correspondingly powerful at Sitcomovi; thus the A′-la, Tcü′-a, and Pat′-ki at Walpi number one hundred and sixty souls, or more than one-half the whole population, but at Sitcomovi there are but ten of these, or between one-tenth and one-fifteenth of the total, and these are confined to one family, the Pat′-ki. The legitimate conclusion which can be drawn from this condition is that these three prominent families, which are the oldest in Walpi, existed there before the settlement of Sitcomovi, and have retained their prominence since that time. Such a conclusion is borne out by legendary history, for these three families are universally said to have been the first † settlers in Walpi.

The strongest family in Sitcomovi is the Ho-na′-ni, Badger, which has thirty-two members against one in Walpi. This fact supports the tradition which states that these people settled Sitcomovi, having quarreled with the other Walpians.

The A′-sa ‡ family is equally divided in the two pueblos, as far as the men are concerned, but very unequally distributed as regards the women and children. Only two A′-sa women live in Walpi, while eleven are domiciled in Sitcomovi, or proportionally one one-hundredth of the whole in one, and one-fifteenth in the other pueblo. This distribution is not at variance with tradition, which states that the A′-sa people originally settled at Sitcomovi, and indicates that they arrived in Tusayan after the separation of the Ho-na′-ni from Walpi. The members of all the other component families of Walpi and Sitcomovi are few in number, with men and women about equally distributed in the two villages. Tradition declares that they were late arrivals on the East mesa, possibly refugees from abandoned pueblos in other

* It probably did not exist even as late as the time of the reconquest of Tusayan.

† The first people were the Bears, of whom only five descendants survive in Walpi and none in Sitcomovi.

‡ See my remarks on the blood-kinship of this family in a former article.

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parts of Tusayan. Supposing now that the present vigor of families in these two villages has some relation to their age, or that the strongest in numbers today was probably proportionally powerful in the past, we arrive at the conclusion that the Horn, Snake, and Water House families were early settlers at Walpi, and that the Badgers and A'-sa founded Sitcomovi.* Turning to traditions, we find that they state the same thing, which is probably as near as we can hope to get to the vague history of these pueblos.

The element of possible error in my reasoning is, of course, the danger in supposing that families now powerful were formerly the strongest. In some instances this objection might be fatal to my conclusion, but in this case we are justified in accepting the premise. The support of tradition indicates that by using it we are not assuming too much. The general conclusions to which the preceding discussion tends, are:

1. That none of the pueblos on the East mesa of Tusayan occupied their present sites two hundred and fifty years ago.

2. That Walpi was built on its present site by the Bear and Snake peoples, later joined by the Horn and Water House, some time between 1680 and 1700.

3. That Sitcomovi was settled by malcontents of the Badger family in Walpi about the first decade of the eighteenth century.

4. That the Ka-tci'-na cult is a secondary one in Tusayan and was brought there by the Badger people in comparatively recent times.

If we can trust the legends that the Ho-na'-ni brought the Ka-tci'-na dances and that they came after the Bear, Horn, Snake, and Water House, the original ritual of the Walpians was composed of ceremonial unmasked observances the group which I have elsewhere called the Nine Days' ceremonials. This conclusion would seem to be indicated by the great differences in the two groups, and implies that the Ka-tci'-na were an incorporated cult in the composite system. Moreover, as we would

*The remaining smaller families, it is supposed, united themselves with these powerful ones at some more recent date than the original settlement. They may have been made up largely of captives or refugees from destroyed pueblos; but both the analysis of the census and existing legends show they were not of the original inhabitants of the East mesa.

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expect, the family who brought that cult came from the east or neighborhood of the eastern pueblos, where such dances long ago existed and still survive. As additional evidence of their kinship, telling in favor of the derivation of the Ka-tci'-na from the east and southeast, may be added the linguistic argument that the same word ("Ka-tci'-na, Cachêna") is common to the two localities.

The Ka-tci'-na gens is placed among the Badger people and is represented as a separate family in Walpi. It is an interesting fact that the official badge of the Ka-tci'-na cult is held in this pueblo by Intiwa and not in Sitcomovi, in which the majority of the Badgers live. This fact would lead us to suppose that the separation of the Badgers from the other Walpi families was not due to a difference in their cult, since their palladium* was left behind at the time of separation. The separation of the Ho-na'-ni from the Ka-tci'na was after the nature of a schism, and by some inexplicable cause the smaller division still hold the badge of the Ka-tci'-na(s).

Every nine days' ceremonial has its characteristic sand picture forming an essential part of the altar, but in the Ka-tci'-na celebration these rarely exist. This fact with others tells in favor of the theory of a different origin of the two groups of ceremonials which formed the two cults still extant in Walpi. I believe the sand pictures are characteristic of the primitive cult of Tusayan, and when they exist in Ka-tci'-na observances are derivative and secondary.

It is a well-known fact that the Navajos practice elaborate sand painting, which is supposed to have been derived from the Pueblos. I am not sure, however, that such is the case, and certainly new arguments must be brought forward before such a conclusion can be adopted. As all the more elaborate sand paintings occur in ceremonials of the more primitive cult, and as a rule these resemble more closely the ceremonies of the nomads, I am inclined to ascribe the habit of sand painting to some semi-nomadic race, from which it was derived by both Pueblos and Navajos. The existence of this habit among California Indians is highly suggestive, and it is to this region rather

*Ti'-po-ni or society badge, which is the insignium of the chief of the Ka-tci'-na.

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than to the original home of the Athapascans that we should look for the people who first practiced it.*

The accompanying list, giving the names of the peoples and the ceremonials ascribed to them, shows that most of the rites of the primitive cult, or Nine Days' ceremonials, were introduced† by the earliest peoples of Tusayan.

The following ceremonials were introduced by the prominent peoples of the population:

Peoples.	Fetishes or ceremonials.
Ho′-nau-ûh } Pa′-kab }	Al-wymp-ki-ya.
Tcü′-a {	Wü-wu-tcim-tü, } New Fire. Na-ac-nai-ya, } Tcü-tcüb (Snake-Antelope).
A′-la } Len′-ya }	Le′-len-ti (Flute).
Pat′-ki {	Co-yal′-uñi-a. Pa′-lü-lü-koñ-ti. Kwa′-kwan-tü.
Pi′ba	Ta′-tau-kya-mûh.
Ho-na′-ni	Ka-tci′-na(s).

The contingent of the inhabitants of Walpi who say that their ancestors came from the south (Pa-lat-kwa-bi) includes a total of fifty-seven, or about one-fifth the whole, if we limit the claim to the Pat′-ki, or one-third if we include the Tü′-wa and Ta′-bo. Next to the A′-la the Pat′-ki are the strongest in numbers in Walpi today, and with the Earth and Rabbit people form one-half the population of Sitcomovi. If the legend that these peoples came from the far south can be relied upon, the proportion of those from this region is large. The whole discussion, of course, hangs on the truth of the statements which the priests make about the situation of their original home, and I can only

*Sand painting has become a pastime in Japan, but in certain Asiatic tribes it still retains a sacred character.

†These data were obtained independently of the others pointing to the same conclusion.

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reiterate the story, often repeated, that the Pat-ki people came from the south.

The most numerous people in Walpi are the Horn people, constituting about one-fourth the total population. Both they and the Snake claim that their ancestors came from the north, and that they built houses on many sites before they entered the land where they now dwell. No one distinctly states that they were ever nomads, but it is probable that they lived for a long time a semi-nomadic life.

These facts, indicating the amalgamation of peoples from different directions, while supporting the belief in the composite character of the Hopi Indians, throw only an uncertain light on their kinship with other stocks distinct from those of the Pueblos. Nothing has here been brought forward to point to any intimate relation with the nomads, although it has been indicated that certain component families have Navajo blood. The Hopi people of the East mesa of Tusayan are composite, but in them the blood of the Pueblos predominates. They claim kinship with the other sedentary tribes of New Mexico and Arizona and speak a tongue which is peculiar to them, but with many foreign words from Tanoan, Keresan, Piman, and other sources. Even their language is a composite one, tempting one who relies wholly on linguistics as a basis of classification to associate them with now one and then another linguistic stock as their nearest kin, accordingly as he studies one or another component. It is with these and similar composite peoples that the linguist should observe great caution in his generalizations.

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JAMES CLARKE WELLING.

On September 4 Dr. JAMES C. WELLING, formerly President of the Anthropological Society of Washington, died suddenly at Hartford, Connecticut.

Dr. WELLING was born in Trenton, New Jersey; was educated at Princeton College, receiving from that institution the degree of A. B. in 1844 and A. M. in 1847, and the degree of LL. D. from Columbian University in 1868. He was president of St. John's College, Maryland, in 1867; professor of *belles lettres* at Princeton in 1870; president of Columbian University in 1871 and of the Corcoran Gallery of Art in 1877; a regent of the Smithsonian Institution in 1886, holding the last three offices at the time of his death. He was one of the founders of the Anthropological Society of Washington and its President during 1891 and 1892.

His studies were directed chiefly to history, political economy, and philosophy. He was an excellent linguist and was distinguished for breadth of culture and catholicity of judgment. At the outbreak of the civil war he was on the editorial staff of the National Intelligencer, and wrote for that journal a series of articles on constitutional and international law as applied to the pending difficulties that were noted for their soundness and for their scholarly and impartial tone. He was engaged at the time of his death upon a history of the civil war and upon various philosophical works. He was a frequent contributor to the AMERICAN ANTHROPOLOGIST, his latest contribution being the article on "The Last Town Election in Pompeii," published in July, 1893.

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BOOK NOTICES.

Nagualism: A Study in Native American Folk-lore and History. By Daniel G. Brinton, A.M., M.D., LL.D., D.Sc., &c. Philadelphia, 1894, McCalla, 8vo, 66 pp.

Nagualism was a powerful and mysterious cult which united Mexican and Central American tribes, belonging to different linguistic stocks, into organized opposition against the government and religion of their conquerors. The members of this intertribal organization were bound together by strange faculties and an occult learning which placed them on a par with the famed thaumaturgists and theodidacts of the Old World, and which preserved even into our days the thoughts and forms of a long-suppressed ritual.

The terms *nagual*, *nagualism*, *nagualist* are not Nahuatl, but of southern origin. A *nagual* was a personal guardian spirit, a personal totem, chosen in accordance with fixed rules and by consultation of an elaborate calendar, which was used mainly in astrological divination.

The nagualists were powerful enchanters, whom the clergy believed to be in league with the devil and who were thought to be able to transform themselves into beasts. They used in their operations an intoxicant, *peyotl*, and the seeds of a plant called *ololiuhqui*. Intoxication was an essential part in many of these severe rites. Under the old régime and before the coming of the Spaniards nagualists were especially devoted to the native cult; but it is Dr. Brinton's opinion, which he sustains with great research, that on the appearance of a foreign race and a new religion a new *motif* was given to this old cult. Those most interested in it turned their sorceries and enchantments with organized, terrific, and often with successful energy against a common enemy. Even the rituals of the Catholic church were travestied in the nagual ceremonies. Dr. Brinton gives a charming account of the exalted position assigned to women in this mysterious society. They were not only admitted to the degrees, but often held most important offices. One of them, Maria Candelaria, was among the Tzentals of Chiapas a native

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Joan of Arc. The nagualistic rites were highly symbolic, and the symbols had clearly defined meanings. The most important symbol was fire. Of this Father de Leon says: "If any of their old superstitions has remained more deeply rooted than another in the hearts of these Indians, both men and women, it is this about fire and its worship and about making new fire and preserving it for a year in secret places."

Another symbol still venerated as a survival of the ancient cult is that of the tree. The species held in special respect is the ceiba (*Bombax ceiba*). The conventionalized form of this tree strongly resembles a cross, and this came to be the ideogram of "life."

The serpent was another revered symbol. In Chiapas one of the highest orders of the initiated was that of the *chanes* or serpents.

In reading this learned treatise one is strongly reminded of the studies of Mr. James Mooney, of the Bureau of Ethnology, upon the Ghost dance. There were exhibited at the World's Columbian Exposition four transparencies representing men and women going through the Ghost dance ceremonies, many of them swooning. It were easy to transfer these pictures to the scenes of Dr. Brinton's book. The subject is one of great interest to ethnologists, who have to thank Dr. Brinton for bringing together such a harvest of material from a field in which he is easily the chief gleaner. OTIS T. MASON.

The Snake Ceremonials at Walpi. By J. Walter Fewkes, assisted by A. M. Stephen and J. G. Owens. (A Journal of American Ethnology and Archæology. Vol. iv. Boston and New York, 1894.) Sq. 8°, vi, 126 pp., ills.

Captain Bourke, in 1883, first called the attention of the civilized world to the wonderful snake ceremonial of the Moki or Hopi of Arizona. After his return to the east in that year there appeared in several newspapers articles descriptive of the rite, most of which articles were probably the result of interviews with Captain Bourke. It was not until the following year (1884) that his important work on "The Snake Dance of the Moquis of Arizona" appeared. During the decade following his first

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visit this biennial rite was repeated five times at Walpi and was witnessed by hundreds of white men and women, among whom were many scientists, newspaper reporters, photographers, and artists. In this way it has come to pass that the ceremony has often been depicted and described. In the bibliography which is appended to the work under review fifty titles are given; but this is by no means a complete list. We recollect seeing several articles which are not noticed in this bibliography.

Yet none of all these works describe more than portions of the last two days' work of the ceremony, and the greater part speak only of the very last important act of the last day—the public snake dance around the sacred rock at Walpi. It remained for the authors of the present work to gain access to the underground temples (estufas, kivas) of the Antelope and Snake priesthoods, and there to witness the esoteric rites of nine days' duration, preceding the wonderful public exhibition which has so excited the admiration of all beholders, savage and civilized.

The work before us describes these observances, as well as they could be seen and studied, by three industrious and painstaking scholars on two occasions—the ceremonies of 1891 and 1893. It contains, besides, much information gathered while the rite was not in progress, and quotes, when necessary, observations made by other students, such as Captain Bourke, Dr. Yarrow, and Mr. Mindeleff. One of the authors, the late A. M. Stephen, not only observed this rite (or series of rites) during its long continuance, but he lived years among the Moki or in their neighborhood collecting collateral information concerning the rite and other matters of ethnographic interest.

The authors have thus collected a vast amount of information concerning the rite and have performed a wonderful and praiseworthy work. Yet (and it is no discredit to them to say this) the task is still incomplete. All has not been told; all has not been discovered. In several cases the authors acknowledge their ignorance; in other cases deficiencies are evident to one acquainted with the rites of other tribes.

One of the most notable deficiencies is the absence of texts and translations of the prayers and songs, but these may yet be procured. There is now, we believe, no good English-speaking interpreter of the Moki language living—none who could do justice to the sacred literature of the people—but many of the

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Moki children are now attending school and learning to speak English. In a few years good interpreters may be found among them. Dr. Fewkes has fortunately secured many of the songs on phonographic cylinders, where they may be studied years hence, when the priests are dead and the rite forgotten.

Dr. Fewkes, we believe, intends to continue the work and find out still more about the snake dance. We wish him every success; yet we fear he will be greatly hampered by the loss of his assistant, Mr. Stephen. Dear old "Steve!" as he was familiarly known to his multitude of friends in Arizona and New Mexico—a man devoted to ethnographic research without regard to the pecuniary reward which his work might bring him. He died, after a lingering illness, at the Moki village of Sichomovi, in April of this year, pursuing his studies to the last.

The myth upon which the rite is based and a section on the interpretation of the myth complete the book. The conclusion at which Dr. Fewkes arrives is this: "The snake dance is an elaborate prayer for rain, in which the reptiles are gathered from the fields, intrusted with the prayers of the people, and then given their liberty to bear these petitions to the divinities, who can bring the blessings of copious rains to the parched and arid farms of the Hopi."

On page 107 we twice find the expression "morning dove" where mourning dove, no doubt, is meant. This is the only error we have noted in the text.

The illustrations, which are numerous, are not of equal merit. The frontispiece and the figure facing page 88, both by Julian Scott, are worthy of that gifted artist. The process copies of photographs are indistinct and not very instructive. We have reason to fear that an error has been made in the figure of the pahos, on page 27.

W. MATTHEWS.

Memoirs of the International Congress of Anthropology. Edited by C. Staniland Wake. Chicago: The Schulte Publishing Company, 1894, 8°, 375 pp. $5.00.

The World's Columbian Exposition brought together the largest body of anthropologists ever assembled in America. Over two hundred and fifty members of the International Con-

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gress of Anthropology were registered, the number including practically all the leading workers in the various lines of American anthropology.

The Memoirs of the Congress, titled above, form a most valuable contribution to anthropologic literature and a lasting monument to the excellent work the congress has done. The volume was edited by Prof. C. Staniland Wake, on behalf of the publication committee, of which Dr. Franz Boas, Prof. W. H. Holmes, and Prof. F. W. Putnam were associates.

The papers presented before the congress were classified under the heads of physical anthropology, archeology, ethnology, folk-lore, religion, and linguistics. Most of these papers appear in the Memoirs, arranged in the same groups, as follows:

Presidential address: The "nation" as an element in anthropology, by Daniel G. Brinton.

Physical anthropology: The anthropology of the North American Indian, by Franz Boas. The anthropometry of American school children by Gerald M. West.

Archeology: The discovery of an artificially flaked flint specimen in the Quaternary gravels of San Isidro, Spain, by H. C. Mercer. Aboriginal American mechanics: a study in the history of technography, by Otis T. Mason. Archeological researches in the Champlain valley, by G. H. Perkins. Anthropological work at the University of Michigan, by Harlan I. Smith. The antiquity of the civilization of Peru, by Emilio Montes. Cave-dwellers of the Sierra Madre, by Carl Lumholtz. Orientation, by A. L. Lewis. The tumuli of Hampshire as a central group of the tumuli of Britain (abstract), by John S. Phené. Natural history of flaked stone implements (illustrated), by W. H. Holmes. Cache finds from ancient village sites in New Jersey (illustrated), by Ernest Volk.

Ethnology: On various supposed relations between the American and Asian races, by D. G. Brinton. Bark cloth (abstract), by Walter Hough. Love songs among the Omaha Indians, by Alice C. Fletcher. Primitive scales and rhythms (illustrated), by John Comfort Fillmore. Secret societies and sacred mysteries, by Stephen D. Peet. Observations among the Cameroon tribes of west central Africa, by C. H. Richardson. Ethnological exhibit of the Smithsonian Institution at the World's Columbian Exposition, by Otis T. Mason. The germ of shore-land pottery: an experimental study (illustrated), by Frank Hamilton Cushing.

Folk-lore: Ritual regarded as the dramatization of myth, by William Wells Newell. Some illustrations of the connection between myth and ceremony, by Washington Matthews. The fall of Hochelaga: a study of popular tradition, by Horatio Hale. Folk-lore of precious stones, by George Frederick Kunz. The coyote and the owl (tales of the Kootenay Indians), by A. F. Chamberlain.

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Religions: The scope and method of the historical study of religions, by Morris Jastrow, Jr. An ancient Egyptian rite illustrating a phase of primitive thought, by Sara Y. Stevenson. A chapter of Zuñi mythology, by Matilda C. Stevenson. The religious symbolism of Central America and its wide distribution (abstract), by Francis Parry. Museum collections to illustrate religious history and ceremonials, by Cyrus Adler.

Linguistics: The present status of American linguistics (abstract), by Daniel G. Brinton. Classification of the languages of the north Pacific coast, by Franz Boas.

Supplementary: Die bewohner des Gran Chaco, Paraguay, von Emil Hassler. Vilen als Heilkundige im Volkglauben der Suedslaven, von Dr. Friedrich S. Krauss.

The volume is well printed on excellent paper; it is not carefully edited, but this, fortunately, does not detract from its scientific value.

It is learned that the demand for the Memoirs, particularly by Europeans, has been very great, and already fear is entertained lest the limited edition may soon become exhausted.

F. W. HODGE.

TRANSLATION OF THE RUDO ENSAYO.—The American Catholic Historical Society of Philadelphia devotes the June number of its quarterly Records to the publication of an English translation by the late Eusebio Guitéras of the Rudo Ensayo. This anonymous essay, which was written in 1763, contains much valuable data regarding the Piman tribes. It found its way into the Mexican national archives, and in 1863 a limited edition was printed by the noted antiquarian, Buckingham Smith.

F. W. HODGE.

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NOTES AND NEWS.

THE MOJO OR MOXO are a numerous people of Bolivia who were christianized at an early date, when all the interior regions of that section were considered *provincias del Perú*. The Jesuits, who were the only colonizers, had in 1689 about thirty stations among the *Indios reducidos* or natives placed on reservations. In 1701 Padre Pedro Marban published his Mojo grammar, or *Arte de la lengua moxa*, and appended to it his rather extensive vocabulary of the same language, first the Spanish-Mojo, followed by the Mojo-Spanish, the doctrine of the holy sacrament and other portions of the Catholic ritual. The whole has just been republished in a facsimile edition by Dr. Julius Platzmann, of Leipzig, in his customary careful manner, under the title "Arte de la lengua Moxa con su vocabulario y cathecismo, compuesto por Julio Platzmann. Edicion facsimilar, in 16mo. Leipzig. B. G. Teubner, 1894." The volume contains 664 + 203 pages.

J. J. von Tschudi, in his *Organismus der Khetshua-Sprache*, 1884, page 29, gives us the following particulars about the Mojo language and the people by whom it is spoken. The Mojo at present inhabit an area of about three hundred and sixty square leagues, situated in the eastern Bolivian province of Beni, which comprises the sections of Mamoré y Pampas and Itómanes y Bá-ure. The principal dialects spoken there are the Moja, the Itóname, and the Bá-ure, the two last named being confined to the section on Madeira river named after these tribes. Their country lies between 12° 13′ and 17° south latitude and 46° and 51° west longitude. The whole population probably does not exceed 25,000 souls. Moja is still spoken in the villages of Loreto, Trinidad, San Xavier, and San Ignacio. The work of christianizing the Mojo as well as the Chiquito tribes was begun by the Jesuits in the latter part of the seventeenth century; the former were settled in fifteen agricultural missions, where they were held under severe rule. The Maipure Indians of the Upper Orinoco are most nearly related to the Mojo in language, though there is no tradition of the early separation of these groups.

A. S. GATSCHET.

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ILLITERACY IN THE UNITED STATES.—The figures relating to illiteracy in the United States have recently been given to the public through the Abstract of the Eleventh Census.

The following comparative statement will show the number of persons in the United States ten years of age and over, number and per cent. of illiterates, with their nativity, 1880 and 1890:

Population Ten Years of Age and Over in the United States, Number and Per Cent. of Illiterates, with Their General Nativity, 1880, 1890.

Classification.	1890.	1880.
Population ten years of age and over	47,413,559	36,761,607
Illiterates	6,324,702	6,239,958
Per cent. of illiterates	13.3	17.0
White population ten years of age and over	41,931,074	32,160,400
Illiterates	3,212,574	3,019,080
Per cent. of illiterates	7.7	9.4
Native white population ten years of age and over	33,144,187	25,785,789
Illiterates	2,065,003	2,255,460
Per cent. of illiterates	6.2	8.7
Foreign white population ten years of age and over	8,786,887	6,374,611
Illiterates	1,147,571	763,620
Per cent. of illiterates	13.1	12.0
Colored population * ten years of age and over	5,482,485	4,601,207
Illiterates	3,112,128	3,220,878
Per cent. of illiterates	56.8	70 0

It will be seen from the statement above that the greatest increase in the population ten years of age and over has been among the native whites, and the percentage of illiterates has decreased 2.5 per cent.

While the increase in the foreign white population ten years of age and over has been about five millions less than the increase in the native white population, the per cent. of illiteracy has increased 1.1 per cent. in the decade.

There is a decrease of 13.2 per cent. in illiteracy among the

*Persons of Negro descent, Chinese, Japanese, and civilized Indians.

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colored population in the United States ten years of age and over, which is greatest (15.1 per cent.) in the South Atlantic division.

In the western division the illiterates among the colored population have increased 8.3 per cent. This increase is probably brought about by including a number of Indians in these States.

Later returns from the Census Office will give statistics of illiteracy more in detail and will show the condition of what may be termed confirmed and unconfirmed illiterates. Unconfirmed illiterates are those between the ages of ten and twenty-one years of age, presumably within the reach of the educator, and confirmed illiterates are those beyond the school age, and who will probably not change their condition.

J. H. BLODGETT.

THE DE LAINCEL EXPLORATIONS.—The following is an abstract of a report of the recent exploration conducted with the funds appropriated by Mr. de Laincel for linguistic and paleographic research:

The field of operation during 1893 and 1894 has been Southern Mexico. The work has been carried on under the direction of the late Dr. Hilborne T. Cresson, of Philadelphia. Valuable results have been obtained in the states of Tabasco, Chiapas, and Tamaulipas. Dr. Seler's report of extensive ruined structures around the headwaters of the Rio Panuco has been confirmed. The ruins of Teotihuacan, Cholula, and Mitla were visited. While at the City of Mexico a careful examination of the center slab of the so-called "cross group" from Palenque was made in conjunction with Dr. Max Büchner, of Munich, now traveling in Mexico. Dr. Cresson returned north early in the season, and it was the intention to have the work continued in Huasteca during the hot months by residents acting under his direction, but his recent sudden death in New York city has doubtless made a radical change in the plans.

A. S. GATSCHET.

AUGUSTUS SCHULTZE, D. D., president of the Moravian College at Bethlehem, Pennsylvania, in 1889 first attempted the compilation of a brief grammar and vocabulary of the Eskimo

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dialect spoken on Kuskokwim river, Alaska. This has now been augmented by new material obtained by the Rev. John Kilbuck and others working in that field, and republished as a "grammar and vocabulary" at Bethlehem, Pennsylvania, 1894, covering seventy pages. The vocabulary is Eskimo-English and English-Eskimo; some hymns and colloquial phrases are added to the volume. The words of the vocabulary are partly syllabicated, and the alphabet used is a scientific one. A dual exists in the noun as well as in the adjective, pronoun, and verb. The numeral system is quinary-vigesimal. There are two conjugations of the verb, the one with suffixes and the other without suffixes. They correspond in a general sense to our transitive and intransitive verbs. Schultze's terminology of the verbal forms should be more precise, and instead of prepositions he should call the particles in question "postpositions." The work is so short that it can hardly be called anything else but a compendium; but the linguistic data are substantially correct.

A. S. GATSCHET.

THE HEMENWAY COLLECTIONS.—The extensive collection of archeological specimens taken from the pueblo ruins of the Salado and Gila valleys, southern Arizona, and at Zuñi, New Mexico, by the Hemenway Archeological Expedition under the direction of Mr. F. H. Cushing, as well as the valuable collections made principally at Tusayan by Dr. J. Walter Fewkes, the present director of the Hemenway investigations, have been deposited in the Peabody Museum at Cambridge. While this deposit is regarded as but a loan, it is not improbable that it will ultimately become a gift to the Museum.

The collections made by Mr. Cushing number some twenty-five thousand articles, which since 1887 have been stored at Salem. The action of the trustees of the estate of the late Mrs. Hemenway in making these splendid collections accessible to students is highly commendable.

Most of the many interesting and valuable articles illustrative mainly of modern Tusayan life, collected by Dr. Fewkes, have for some time been exhibited in the National Museum at Washington. These also have been transferred to Cambridge.

F. W. HODGE.

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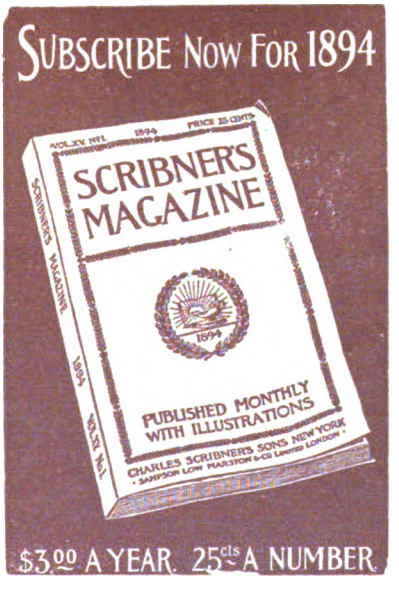
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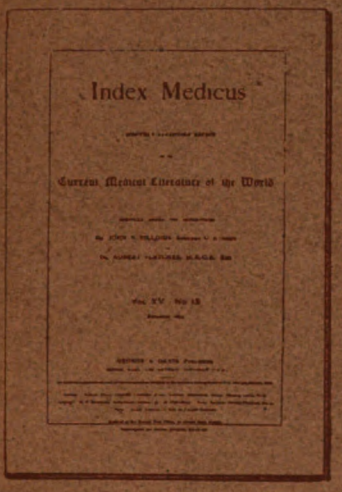
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